



**Report
of the
Tariff Commission on Prices
of
Coal & Soft Coke
&
Pricing System for Washed Coal
&
Washery By-Products**

GOVERNMENT OF INDIA
MINISTRY OF STEEL, MINES AND METALS
(DEPARTMENT OF MINES AND METALS)

New Delhi, the 27th November, 1967.
6 Agrahayana, 1889.

RESOLUTION

No. C5-12(18)/67.—The Government of India in the Ministry of Commerce Resolution No. 20(2)-Tar/66, dated the 27th August, 1966, requested the Tariff Commission under section 12(d) of the Tariff Commission Act, 1951, to undertake a comprehensive inquiry into the cost of production of coal and coke in the country and make suitable recommendations in regard to the price of coal and coke having regard to the future needs of the coal industry as well as of industries and other major consumers of coal.

2. The Commission signed its report on the 25th July, 1967, and copies were received by Government thereafter. The conclusions and recommendations, as summarised by the Commission in the report, are appended.

3. Some of the recommendations relate to or have a bearing on, prices of coal and soft coke. Government have, however, decontrolled the price of all coal and softcoke with effect from the 24th July, 1967.

4. The Government have carefully considered the other main recommendations. Following is a gist of the decisions/conclusions of Government on the various recommendations:—

(i) *Recommendation 2.*—Noted for examination.

(ii) *Recommendations 4, 38 and 39.*—The general issue of subsidies has been remitted to a Study Group for examination. It is being apprised of Recommendation 4.

PERSONNEL OF THE COMMISSION

SHRI M. P. PAI	.	.	.	.	.	<i>Chairman</i>
SHRI M. ZAHEER	.	.	.	.	.	<i>Member</i>
PROF. K. T. MERCHANT	.	.	.	.	.	<i>Member</i>
SHRI S. SUBRAMANIAN	.	.	.	.	.	<i>Member</i>

PERSONNEL OF THE COMMISSION WHICH HEARD THE CASE

SHRI M. P. PAI	.	.	.	.	.	<i>Chairman</i>
SHRI M. ZAHEER	<i>Member</i>
PROF. K. T. MERCHANT	<i>Member</i>

Secretary

DR. P. V. GUNISHASTRI

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(ii)

- (iii) *Recommendation 5.*—This is generally acceptable but there is now no distribution control over non-coking coals.
- (iv) *Recommendations 14 and 68.*—Kargali seam is very thick varying from 60 to 95 feet. Even though the average ash content is about 17%, it is not possible to isolate portions of the seam which will be less than 17 per cent ash. Foot by foot analysis of the seam conducted reveals that the ash percentage varies from 13 to 22 with an average of 17. While mining operations are conducted, it is not possible to extract only those portions which have less than 17 per cent ash. It is on account of these peculiarities that after considerable laboratory tests by the C.F.R.I., washing was advised to be undertaken to yield a uniform ash content of 17%. In addition to the 17% ash coal, coals with higher percentage of ash as from Chalkari and Jarangdih etc. are also being fed.
- (v) *Recommendation 15.*—Government have set up an Expert Committee to consider the various possibilities of the use of Assam coal for metallurgical purposes.
- (vi) *Recommendation 18.*—As recommended by the Energy Survey of India Committee, the Planning Commission have constituted a Committee for energy planning headed by Member (Natural Resources) of the Planning Commission, with members drawn from the Ministries concerned for keeping constantly under review the trends in energy consumption in order to reformulate policies as circumstances change.
- (vii) *Recommendation 21.*—This is under examination.
- (viii) *Recommendations 27 and 30.*—Consequent on de-control, grading of coals on the basis of wagon and stack samples has been done away with. As regards coking coals, efforts are being made to evolve a procedure for joint sampling that is acceptable to both the steel plants and the producers.

(iii)

- (ix) *Recommendation 53.*—The need for systematic and intensive mechanisation of coal mines has been recognised. The Coal Development Council has set up a Committee for productivity and modernisation of mines. Amalgamation of small and uneconomic units has been taken up by the Voluntary Amalgamation Committee.
- (x) *Recommendation 54.*—The Committee on productivity and Modernisation of Coal Development Council recommends measures for mechanisation.
- (xi) *Recommendation 57.*—This will be examined.
- (xii) *Recommendation 59.*—This is already under examination.
- (xiii) *Recommendation 64.*—Control over distribution of coals other than coking coal required for metallurgical purposes has been done away with. The Committee on Transport and Distribution of Coal Development Council looks into coal transport problems.
- (xiv) *Recommendation 65.*—A Pilot Project Report prepared by the C.F.R.I. for the popularisation of soft coke is already under the consideration of Government.
- (xv) *Recommendation 69.*—It is appreciated that unit washeries would be economical and operationally efficient for washing coal from reasonably large coal mines, and the washeries built by the National Coal Development Corporation are unit washeries. In the Jharia coalfield most of the mines are very small and unit washeries are not feasible in all cases. A few central washeries which would take care of a large number of small mines were therefore unavoidable. However, the recommendation has been noted for examination.
- (xvi) *Recommendation 70.*—Middlings are being used in Thermal Power Stations. The rejects containing not less than 55% ash have no commercial value and experiments are under way to utilise them as stowing material in underground mines, particularly in the context of shortage of sand reserves.

(iv)

(xvii) *Recommendation 71.*—With a view to ensure the proper utilisation of the washery by-products, Government have taken a policy decision that the boilers of future Thermal Power Stations will be designed so as to consume the by-products. With this and in view, there will be integrated planning, so far as possible, of future washeries and the Thermal Power Stations.

(xviii) *Recommendation 75A.*—This is already under examination of Government.

5. Other recommendations are noted.

(Sd.) N. D. GUPTA,
Joint Secretary to the Government of India.

ORDER

ORDERED that a copy of this Resolution be communicated to all concerned and that it be published in the *Gazette of India Extraordinary*.

(Sd.) N. D. GUPTA,
Joint Secretary to the Government of India.

APPENDIX

REPORT OF THE TARIFF COMMISSION ON PRICES OF COAL AND SOFT COKE AND PRICING SYSTEM FOR WASHED COAL AND WASHERY BY-PRODUCTS

Summary of Conclusions and Recommendations

I. Features of the Industry

1. At present the steel industry, the electricity industry, and the railways together take up nearly 60% of the country's production of coal. A large potential demand exists in the domestic sector and if this demand is exploited, it would revolutionise the industry, and be of lasting benefit to agriculture and forestry.

II. Assistance to the Industry

2. We would suggest that (i) cesses for stowing and adverse conditions be treated as one head and (ii) all collections should be credited as and when made to the Coal Board for the use of subsidies which it considers earned without the need for securing grants from time to time under separate heads from the Consolidated Fund.

3. The question of treating Bhaladiah as a contractor to the extent that it does not service Equitable's own collieries has been raised by the firm with the Coal Board and is at present pending a decision. We suggest that decision should take note of the fact that sand stowing by the Equitable Coal Co. for other firms is not an activity to be treated as part of its own coal raising activity.

4. We would recommend that in the case of all subsidies the objective should be to meet genuinely and economically incurred costs in full. Our suggested prices and pricing system are based on the anticipation that this will be done, and that all subsidies will be realistic.

III. Transport of Coal

5. We recommend that till unit washeries are set up by the principal mines, better coal should be allocated to long

(vi)

distance users than to those nearer the collieries, subject, of course, to the coal being technically suited to the consumer.

IV. Demand for Coal

6. The likely demand for coal during 1970-71 is adopted at 95/100 million tonnes, of which roughly 26.5 million would be coking and 3 million blendable. This would include about 1 to 2 million tonnes for export. Of the 70 million tonnes of non-coking coal about 8.50 million would be required in Selected Grade coals and 30.50 million tonnes in Grade I. The demand for 1975-76 is adopted at 125 million tonnes.

7. Considering that the industry was geared to the production of 100 million tonnes of coal for 1965-66, and as many as 225 mines, have secured equipment and spares under the World Bank Loan, the production of 100 million tonnes would not on the whole need any special effort. Some incentive in the form of a higher differential for the production of the Selected Grades is called for.

8. While there should be no serious difficulty in reaching the target for coking coal for 1970-71, the position for later years is at present insecure.

9. While all industrial needs of coal are being met there is a large unestimated demand for soft coke for domestic use and of slack for brick burning.

10. We feel that the additional production in the private sector of the order of 3 million tonnes of coking coal by 1970-71, and 6 million tonnes by 1975-76, and 25 million tonnes of coking and non-coking coal in both the public and the private sectors by 1975-76 would have to be encouraged. These figures are subject to revision after the Fourth Plan is finalised.

V. Domestic Sector

11. It is necessary to concert long term measures to meet the needs of domestic fuel in a more rational way.

(vii)

12. All possible encouragement should be given to existing policies regarding low temperature, carbonising plants and for the production and distribution of soft coke and briquettes of lignite.

13. There are promising avenues of conservation of coal which require investigation.

VI. Conservation of Coking Coal

14. The technical advisers of the Government may examine the practice of washing coal of 17 per cent ash content at the Kargali washery which appears to us as of doubtful benefit, since the price of the washed product is double that of the raw input.

15. The coking properties of Assam coal are said to be good, and the adverse factor of 4 to 8 per cent sulphur could be reduced to permissible limits if suitable proportions of this coal and of Bengal/Bihar coal are adopted.

16. Action to conserve our limited supplies of coking coal is needed on the following lines :—

- (1) A price inducement for maximum extraction from the seams.
- (2) Subsidies for deep mining.
- (3) Some compensation for restrictions, if and when they are placed deliberately, on the quantity allowed to be extracted by each mine.
- (4) A price which will enforce economy in use.
- (5) Blast furnace efficiency.

17. We are of the view that price incentives provided by a more suitable price structure will encourage increased production, careful removal of shale, and supervised loading of wagons.

VII. A Fuel Policy

18. Steps should be taken to formulate a fuel policy since no single Ministry is concerned with the matter of energy which is now handled in four different departments.

19. Should the target of coal over the next Five Year Plan assumed by us at 125 million tonnes change significantly, the price structure recommended by us may need reconsideration.

VIII. *Finance Position of Industry*

20. The total capital needed for the expansion to 125 million tonnes by the end of 1975-76 would be of the order of Rs. 125 crores. The additional capital to be invested by the private sector would be of the order of Rs. 12 crores per year and this would clearly be beyond its means.

21. Since the immediate need is for the increase of production only of coking coal—capacity for non-coking coal being adequate over the current plan—a cess of Re. 0.50 to raise these funds may meet the Fourth Plan needs.

IX. *Pricing System*

22. We are of the view that the price structure for coal under present conditions in the country cannot well be based either on average or on marginal costs, and that the basis adopted by the Coal Price Revision Committee still continues to be, by and large, sound.

23. We have come to the view that the broken down costs of the units whose O.M.S. is around the national average of private sector units, with some adjustments would be fair to adopt as norms for the price structure.

24. We consider that prices should not be changed for a period of at least two years at a time, and that these instead of being *ad hoc* should be based on a quick cost examination of a few units before the end of this period.

25. The best time to introduce any price change would be some time after the passing of the budget of the Government of India so as to allow for fiscal measures which might affect the producing or the consuming industries.

X. Grading, Specification and Testing

26. The full exploitation of Singareni Grade I coal is of some importance since it would reduce the fuel costs of the cement factories of South India which now get their supplies from Bengal-Bihar.

27. We are of the view that with a view to guaranteeing quality, the I.S.I. standards for joint sampling of coal should be enforced as soon as practicable. Till this is done a greater check on quality should be secured by more frequent tests by the Coal Controller, whose staff should be strengthened for the purpose. Whenever the quality loaded by a colliery from any seam goes up or down consistently it should be re-graded speedily. This will ensure better preparation of coal and better supervision at the time of loading.

28. We suggest that ash be penalised at 1.5 per cent of its weight.

29. The price structures which now obtain in this country for coal give advantages to some areas which are in the nature of economic rent and could only be got rid of, if at all possible or desirable, under a scheme of nationalisation. To overlook historical price differences will seriously upset the economies of many mines.

30. Necessary investigations should be made and arrangements set up for sampling of coal either at despatch or delivery point as the investigations may show to be the most convenient. Till then the arrangements suggested in para 18.4.6 would be necessary.

31. The fixation of prices of existing grades on the basis of useful heat units shown in Appendix VI is scientific, practical and desirable. We have decided to adopt these in our price recommendation.

32. Some increase in prices of coking coals will be in the long term interests of the industry and the consumer since coking coal has to be won increasingly from greater depths and in more difficult mining conditions.

33. For the future we consider that the grades should be in slabs of useful heat value arrived at on a convenient basis. This would be best done in the case of Bengal-Bihar non-coking coals by having slabs of 300 k. Cal. per kg. which would retain the number of grades at six. In the case of the outlying coalfields the slabs could be 500 k. Cal. since this coal is inferior compared to that of Bengal-Bihar, and would result in four grades as at present.

34. The grades of coking coal A to G could well be reduced to three with differences of 2 per cent, grades A, B, and C, grades D and E, grades F and G being combined, with ash percentages of under 13 and up to and including 15, over 15 up to and including 17 and over 17 up to and including 19 or in terms of useful heat values, slabs of 300 k. Cal. per kg. The next two grades could be of ash percentage over 19 up to and including 21 and over 21 and upto and including 24%.

35. We have come to the conclusion that the prewetting of samples is scientifically sound, and commercially desirable, and in settling the price structure we have taken this aspect fully into consideration.

XI. Cost of Production and Future Prices

36. The cost structure as evolved by us is exclusive of royalty and any brokerage or commission on sales or despatches.

37. We have adjusted the costs of all the costed and non-costed units to the variable dearness allowance payable at the seventh slab i.e. at the rate of Rs. 1.33 per manshift.

XII. Suggested Price Structure

38. We recommend that the Coal Board should examine the question of extra expenses incurred for gassiness and revise the scales of subsidy suitably if it be found that the present scales of subsidies are inadequate.

39. We recommend that the Coal Board should review the methods of subsidy for stowing and evolve a system of reimbursement which is realistic, and encourage stowing where desirable in the national interest.

40. We do not, consider that any artificial increase of the differentials settled by the useful heat value is called for.

41. We propose that the excise duty should be increased by Rs. 1.50 per tonne for the coking grades A & B, and Re. 1 for the coking grades C and D to be recovered from the producers. Alternatively, or if it be preferred as administratively more convenient to recover this additional cess from the buyer, then the recommended prices should be correspondingly reduced.

42. To afford some relief to the producers of mainly lower grades of coal we propose to raise the ceiling prices of high moisture Grade II Bengal-Bihar region to Rs. 25 per tonne and for grade IIIB to Rs. 24. For the Maharashtra, M. P. and Orissa regions where the proportion of production of grades II and III is more than 50% of the entire production, we propose a ceiling price of Rs. 27 per tonne for grade II and Rs. 26 per tonne for grade III.

43. We recommend the complete decontrol of Singareni coals, and subject to an examination by the Government of India in consultation with the State Government, of Assam Coal also.

44. We would expect the producer to absorb increases of costs upto at least the economy due to normal average improvement of O.M.S. dealt with in paragraph 22.3. The formula for adjusting the price for any change in variable dearness allowance above or below the 7th slab to which level the recommended prices correspond, would be as indicated in paragraph 22.4.

45. As regards the effects of the new Wage Board Award, we are of the opinion that it will have to be separately estimated. This we shall do as soon as the orders of Government on the Award are made known to us.

XIII. Mechanisation

46. There is considerable scope not only for machanisation of open cast workings but also for changing to open

cast recovery the underground workings of some whose cost of removal of overburden by mechanical means is lower than that of driving shafts or inclines to approach the coal.

47. The advantages of mechanical loading are (1) attainment of higher rates of loading and (2) reduction in cost on higher rates of loading. The disadvantage appears to be that if the equipment remains idle due to reduction in the volume of despatches the loading cost per tonne rises steeply.

48. On the available figures it would be clear that the cost of production of coal by mechanical means *i.e.* mechanical cutting and mechanical transport is lower than that by manual cutting after blasting and manual loading into trolley-cars by Rs. 2 to 3 per tonne, and that economy in costs of mechanical loading from a bunker filled by conveyor belting transport would be of the order of Re. 1 per tonne.

49. Steps should be taken by Government to see that there are no overlapping items of machinery and equipment produced by the Mining and Allied Machinery Corporation and the private sector.

50. A study should be made of spares imported in quantity by all mines taken together and indigenous capacity set up for them. The complaints that coordination between manufacturers of machinery and mines is inadequate, and that there is not even a specific guide or directory of available supplies of spares or capacity to produce spares should be remedied.

51. Mechanisation cannot be profitable or lead to higher productivity in the case of mines with a production of less than 100,000 tonnes annually. Mines which have a lower production should, therefore, be amalgamated with others or closed down if mechanisation (semi or full) is to be adopted.

52. It is necessary to ensure that mining machinery of the requisite type is made available in the country at reasonable cost and that manufacturers carry reasonable stocks of spare parts.

53. Instead of a halting and reluctant changeover, with setbacks and wastage of money and effort, it is desirable to bring about an ordered and well planned change-over to mechanisation. The first and the most necessary setps to be taken is to bring about a closure of small mines or their amalgamation with others in order to constitute economic units. Open cast mines are most amenable to full mechanisation and a programme should be adopted for the production of adequate mining machinery for such mines at prices not much above that of imported machinery and of comparable quality.

54. It is not a sound policy to leave problems of mechanisation to be tackled by individual units but they should be handled by Government or a duly constituted authority.

XIV. Holding the price line

55. All increases in prices have been of an order that could not, in our view, have been substantially absorbed with good management alone, though some absorption should not have been impossible.

56. The fact that responsibility for production and responsibility for safety and welfare of labour lie in two different departments has made adjustment of objectives difficult.

57. The complaint that the efforts of the Director General of Mines Safety to maximise safety has led to the prescription of a large part of the pillars being left intact while retreating and that safety would not be endangered if more coal than at present is extracted may justify a second examination of the technical position.

58. We are convinced that not marginal but significant economy is possible if there is some rationalisation of labour.

59. Our inquiry into costs shows that as a rule the larger mines have lower costs than the smaller ones. In view of the failure of voluntary amalgamation, we recommend that the Government of India should consider the enactment of legislation to secure compulsory amalgamation.

60. There is scope for cost reduction in the industry of a small order through better management, and of a larger order through semi-mechanisation of the recovery of coal.

XV. Impact of price change

61. Our recommended changes in the price of coal are not likely to affect the economy of the country significantly. A ten per cent increase in the pit-head price of coal will affect the costs of production of the iron and steel industry by about 0.5 per cent, thermal generation of electricity by about 5 per cent and the cement industry by about 0.75 per cent. The effect on other industries will be less than 0.50 per cent.

XVI. Fuel Economy

62. We share the impression of the Colombo Plan Experts that the grade to grade price increases were so small as to encourage a clamour for the better grades of coal where they were not always essential leading to a tendency for good coal in short supply to be burnt to offset inefficiency.

XVII. Decontrol of Coal

63. The problems of transport and consumer priorities would have to be carefully examined by the Government before a decision could be taken that it would be in the national interest to allow the economics of coal to be settled completely by market forces.

64. Some chronic railway bottle-necks are yet to be removed. Shortage of transport is a problem the end of which is not in sight and some measure of control would be needed to see that all priority consumers get their needs and in a type of coal suited to their needs.

65. We have no doubt that the encouragement of the use of soft coke to stop the burning of valuable cattle manure and timber has become a matter of national importance. A national plan for the production and distribution of soft coke is overdue and such a plan will involve allocations of coal and regulation of transport.

66. Assam is an isolated part of the Union and for strategic reasons coal production should, we presume, be maintained at a fair level of production in this area. Before the question of decontrol of Assam coals is considered it is necessary that the Central and State Governments should confer and take into consideration the various aspects we have touched upon but which we have not been able to go into in any detail in this report.

67. We are of the view that there is a good case for the lifting of control over Grades II and III of non-coking coal and of all the production of Singareni Collieries Co. with or without the retention of ceiling prices. We recommend that this be done. As regards superior non-coking coals and coking coals it is in our view desirable to take a decision after the results of the decontrol recommended by us are watched for some time and there is fuller appreciation of the capacity of railway transport to meet demand which is not regulated or controlled.

XVIII. *Washeries and washery by-products*

68. We have noticed that a good deal of grade E coking coal is washed and the reason given is that though it could be used without beneficiation if fully up to grade E, it is desirable to wash it to secure a uniform 17 ± 0.5 per cent ash content. This is an issue which we consider that Government might very well re-examine.

69. Arguments for or against unit or central washeries may well be examined by a special committee of experts of the mining and steel industries. Should unit washeries find favour with the Government, it would be necessary to find ways and means for generating funds or loans with which unit washeries could be set up by collieries singly or in combination.

70. It needs to be investigated if soft coke for domestic use could be produced from by-products. Research and development in this respect would be of value. It would be a national loss not to utilise these by-products fully.

71. The problem of by-products of washeries can be met only by incentives to power station operators and soft coke producers to install the necessary equipment to make use of these "wastes". These incentives must be strong enough to justify the capital investment needed, and the price will have to be kept steady over a long period.

72. It is clear that middlings/by-products of washeries and slack coal will be surplus by 1970-71, and embarrassingly so, from 1980-81 onwards. Suitable markets should be created with price incentives to meet the problem.

73. It would not be practicable or fair to have a uniform price for washed coal.

74. We do not think that it would be correct to treat middlings and by-products as of no economic value considering that they contain combustible material capable of producing considerable heat.

75. We recommend that the price formula referred to in paragraph 32.5.1, save for the replacement of Rs. 3 for Rs. 2 towards rebate in sub-para of that paragraph be adopted for pricing washery middlings and by-products.

75(A). We recommend :

- (1) that no excise duties be levied on despatches of coal to a washery.
- (2) that duties be charged only on washed coal and not on middlings or rejects.

If there should be any serious administrative difficulty in respect of (1) above or any scope for fraud, we would recommend in the alternative that no duties be charged on despatches of washery products from a washery.

XIX. *Soft Coke*

76. Unless the increased cost of sophisticated carbonization can be more or less met by the value of by-products it is doubtful if soft coke can withstand competition from other non-commercial sources of energy.

77. The ceiling price of soft coke may be fixed at *Rs. 38 per tonne f.o.r.* Suitable adjustments may be made in this price as the ceiling price of Grade IIIB goes upwards or downwards on the basis of the formula, *viz.*, a change of Re. 1 in the price of Grade IIIB coal would be reflected by a change of Rs. 1·40 in that of soft coke.

78. Improvement in the transport facilities for soft coke, greater regional availability of soft coke by the utilisation of low grade coals in outlying collieries and rationalisation of freight rates in order to bring about a partial equalisation of prices all over the country are matters which need the attention of Government.



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Chapter 1

GENESIS OF THE CASE

1.1. The Government of India in the Ministry of Commerce Resolution No. 20(2)-Tar/66, dated the 27th August, 1966, have requested the Tariff Commission under Section 12(d) of the Tariff Commission Act, 1951, to undertake a comprehensive inquiry into the cost of production of coal and coke in the country and make suitable recommendations in regard to the price structure of coal and coke having regard to the future needs of the coal industry as well as of industries and other major consumers of coal. The price structure to be recommended by the Commission should also take into account the need for conservation of higher grades of coal which are in short supply and the necessity for encouraging wider use of lower grades of coal. The full text of the Government's Resolution containing the terms of reference of the inquiry is given in Appendix I.

1.2. The following are the actual terms of reference to the commission :—

- “(1) to examine and report upon the cost of production of coal/coke in the country taking into account *inter alia* various items which go into the cost of production, including the awards and other relevant factors that have a bearing on the future coal production programme;
- “(2) to examine and report whether in view of the comparative scarcity of higher grades of coal in the country and the imperative need for conserving them, and the need for encouraging the wider use of lower grades of coal, there should be bigger differentials than now exist between the prices of higher grades of coal and those of lower grades;
- “(3) to recommend suitable price structure for different grades of coal produced in different regions;

- “(4) to suggest suitable pricing system for washed coal and washery by-products;
- “(5) to recommend the basis on which prices should be revised in future;
- “(6) to consider and report on the impact of price changes that the Commission would recommend on the economy of the country and on the coal consuming industries generally; and
- “(7) to examine and report whether an increase in the cost of labour, wages, increase in stores cost etc., could not be neutralised by scientifically organised and planned development, modernising and mechanising the mines and by efficient management leading to increased productivity.”



Chapter 2

SCOPE OF THE INQUIRY

2.1. Though it has been asked to examine and report on the cost of production of coal/coke in the country under item No. (1) of the terms of reference, the Commission has decided to *exclude hard coke* from the scope of this inquiry and informed the then Ministry of Mines and Metals, now Ministry of Steel, Mines and Metals, accordingly [*vide* this office letter No. TC/ID/P-29/66, dated 30-9-1966], in view of the fact that Government had already decontrolled the price and distribution of hard coke—B.P. hard coke with effect from 15-1-66, and hard coke from Beehive and country ovens with effect from 1-4-1966. Hence, only soft-coke is included in the scope of this inquiry. Further, though washed coal is also decontrolled [*vide* Government of India Notification No. C. 5-12-(17)/64, dated 17-9-1964], it has been included in the scope of this inquiry to the extent of a possible pricing system.

2.2. A distinction has been made by the Government between 'a suitable price structure for different grades of coal' and 'a suitable pricing system for washed coal and washery by-products' [*vide* items (3) and (4) respectively of the terms of reference]. We therefore sought a clarification from the then Ministry of Mines and Metals in the matter and it replied as follows :

"In the case of coal, the Tariff Commission may examine and report upon the cost of production; that being the base, the Commission should recommend a suitable price structure for different grades produced in different regions.

"In the case of washed coal and washery by-products the position is slightly different. The base in their case will be the raw coal price which would have been determined as in para above, and to this has to be added the cost of washing. The cost of washing

varies from washery to washery. One important governing factor in this regard will be whether the washery is a pit-head one or a central one. The total of price of raw coal and the cost of washing has then to be suitably allocated between washed coal and washery by-product, taking into account factors like economics of iron making and power generation. Another important factor in the case of washery by-products, would be the element of transport. This is important because the power house could get raw coal instead from nearby sources. Another point for consideration would be whether the price of washed coal and washery by-product should vary from washery to washery or there should be pooling of prices.

"It is in the above background that the 'pricing system' would have to be considered by the Tariff Commission as distinct from straight 'price structure' in the case of coal."

2.3. The terms of reference are very wide, but the Commission has in the main to examine the following matters :

- (a) the cost of production of a fairly representative cross section of collieries in different regions of the country, and the issue of suitable price structures for different grades of coal and soft coke;
- (b) the various awards and other relevant factors that have a bearing on the cost of production of coal, including those that are likely to come into force in the immediate future such as the award of the Central Wage Board for Coal Mining Industry which has recently submitted its report to Government;
- (c) the future coal production programme, the structure of coal industry in all its aspects (including its capacity to meet present and future requirements of the country), the financial position of the industry and its capacity to achieve the future production programme;

- (d) conservation of higher grades of coal, and encouragement of wider use of lower grades of coal;
- (e) suitable differentials between the higher grades and lower grades and incentives therefor, the impact of price changes that the Commission would recommend on the economy of the country and on coal consuming industries in general;
- (f) a suitable pricing formula through which prices could be revised speedily in future; and
- (g) the possibility of neutralising increases in the cost of production by scientifically organised and planned development, modernising and mechanising the mines leading to improved O.M.S., and by efficient management leading to increased productivity.



Chapter 3

METHOD OF INQUIRY

3.1. As a first step, we addressed the Coal Controller for basic information such as the names of collieries and washeries in the private and public sectors in different regions in the country, their grade-wise production for the last three years, the representative characteristics of collieries in each region in respect of geological and mining conditions etc., a list of collieries to be considered typical for each region, for the purpose of costing, the names and addresses of colliery-owners' associations, consumers and dealers and their associations, etc. The National Coal Development Corporation was also addressed for similar information as regards collieries and washeries in the public sector.

3.2. Special questionnaires were prepared by the Commission for the purpose of the inquiry and were issued to about 800 collieries, 9 washeries, and many dealers of coal. The consumers' questionnaire was issued to some selected parties. Since coal is consumed by almost all industries, the consumers' questionnaire was issued to the associations representing consuming industries (like chemicals, cement, textiles and so on), the Railway Board, the State Electricity Boards as well as the Indian Merchants Chamber and the Federation of Indian Chamber of Commerce and Industry.

A press note was issued on 30-9-1966 inviting all those interested in the inquiry to obtain copies of the special questionnaires from the Commission's office and submit their replies. All the colliery-owners' associations, the Joint Working Committee representing the four producers' associations, the coal consumers' and dealers' associations were asked to submit detailed memoranda covering the various points raised in the Commission's questionnaires. The National Coal Development Corporation and the Singareni Collieries Ltd., who represent the public sector of the industry were requested to send consolidated memoranda relating to

collieries/washeries under their administrative control. The Coal Controller was requested for a comprehensive memorandum on the present position of the coal industry covering all aspects within the sphere of his functions. Similarly, the Coal Board was addressed in matters relating to the working of Coal Mines (Conservation & Safety), Act 1952, subsidies granted to collieries specially handicapped by different adverse factors, amount of assistance granted and/or spent towards stowing and other protective measures in mines, etc. The Chief Inspector of Mines, (now designated Director General of Mines Safety) was requested to give his views on the implementation of certain regulations relating to safety and welfare of labour employed in the coal mines.

3.3. Necessary data were also sought from the Central Fuel Research Institute, the Indian School of Mines and Central Mining Research Station on matters relating to conservation and economy in the use of better grades of coal and wider and economic use of lower grades of coal. Requests were also made to the Director General of Technical Development and the Mining and Allied Machinery Corporation for information on coal mining machinery; to the Central Statistical Organisation for data on the proportion of coal costs in the total cost of production of various coal consuming industries in order to assess the impact of changes in the prices of coal on the consuming industries in the country; to the Geological Survey of India for estimates of reserves of coal in the working fields and virgin areas in the country; to the National Productivity Council on the question of productivity in coal mines; to the Central Water and Power Commission, Planning Commission and Ministries of the Government of India for energy forecasts; to the Railway Board for the present pattern of coal/coke movement by Indian Railways; to the Central Board of Revenue on matters relating to Central levies on coal; to the Chief Controller of Imports & Exports and the Minerals and Metals Trading Corporation of India regarding export policy and exports; to the Directorates of Industries and Chief Secretaries to the various State Governments on general Matters.

The State Electricity Boards were requested to give specific information relating to the possible use of middlings

and the capital investment needed, if any, therefor. In addition, the labour unions were requested to give their views and information relating to implementation of the Mines Rules, Regulations etc.

3.4. The Indian Embassies and Trade Representatives in some of the important coal raising countries in the world were requested to forward information on the working of coal industry in their respective countries. We also collected some detailed information from the Joint Coal Board of Australia, and the National Coal Board of the United Kingdom.

3.5. A list of parties from whom replies to our questionnaires/letters or memoranda were received is given in Appendix II.

3.6. We thought it desirable to have exploratory meetings with various interests, particularly to settle a list of collieries the costs of which should be examined (more fully dealt with in a later chapter) and to identify issues needing our detailed attention. We had such meetings with the Joint Working Committee of the Coal Producers' Associations on 7-10-1966, 18-10-1966, 4-1-1967, 20-2-1967 and 20-4-1967, with the Coal Consumers' Association and some consumers on 2-5-1967, with the representatives of important Mining Labour Associations on 2-5-1967, and also with the Coal Controller and the representatives of the Chief Inspector of Mines and the Coal Board. Some mines and washeries were also visited. The Chairman and Shri K. T. Merchant, Member, toured parts of the Bengal and Bihar area between the 20th and 24th December, 1966 visiting the Chinakuri mines (mechanised), the Parasia and Kunustoria (mechanised), the Sijua, Bulanbararee, Central Jeenagora, East Basuria and East Bokaro (open cast) mines, the Bhaladih sand gathering plant, and the Lodna, Patherdih and Kargali washeries. They met representatives of the Soft Coke Producers Collieries Association at Dhanbad on 22-12-66. They also visited the Central Fuel Research Institute and had discussions with the Director, Shri Lahiri. The Commission visited the Singareni Collieries Ltd. on the 19th and 20th March, 1967.

3.7. The public inquiry into the Industry was held on the 4th and 5th May 1967 at the Commission's office in Bombay. We discussed the figures of cost arrived at by us with the collieries concerned between the 6th and 27th of May, 1967. A public inquiry into the problem of washeries was held on 27th May, 1967.

3.8. A list of parties who attended the Commission's public inquiry and Group discussions is given in Appendix III.



Chapter 4

SELECTION OF COLLIERIES FOR COSTING

4.1. Our main task in this inquiry is the question of a price policy and structure which will secure the systematic development of the industry, achieve the additional production of metallurgical and high grade non-coking coals required in the future, and help in the conservation of coking and higher grade non-coking coals. The settlement of actual costs of production which would be the basic data, therefore, became the first step in the inquiry. For this purpose we had to make a selection of collieries taking into account, the spread of production in the different coal producing areas, and the characteristics of the coal.

4.2. We obtained notes from the Coal Controller on the above aspects, and also requested him to supply us a list of collieries which could be treated as representative of each of these regions. The Coal Controller supplied us such a considered list of 43 units from which, however, due to the short time within which our report had to be submitted to the Government, we selected after discussion with him 29 consisting of nine collieries from West Bengal, nine from Bihar, seven from Madhya Pradesh and Orissa, two from Maharashtra, one from Andhra Pradesh and one from Assam. We considered it desirable to discuss this list with the Joint Working Committee of the Four Associations of coal producers (hereinafter referred to as the J.W.C.), and therefore had a meeting with them on the 18th October, 1966. We indicated certain criteria for the selection of units for costing, viz., a fair spread of units over the various regions, large and small size of output, degree of mechanisation, and different stages of development. On the matter of size of output, we suggested the exclusion of mines with a production of under 1000 tonnes per month, and a ratio of 1 : 3 between the mines with monthly outputs, 1000 to 10,000 tonnes, and the mines with monthly outputs over 10,000 tonnes, which roughly is the ratio of contribution of these two groups of mines to the national output.

4.3. The J.W.C. who were initially inclined to the view that the list of the Coal Controller would be adequate if balanced with the addition of a few more collieries, later gave us a list of 27 collieries, including 11 sets of two mines of which one or the other could be selected by the Commission, according to the convenience of the Cost Accounts staff, in substitution of the units selected by the Coal Controller. Eight of these suggested by the J.W.C. find a place in the Coal Controller's list as well. The J.W.C. would not however agree that the Coal Controller's list was reasonably representative and preferred to treat their selection of 16 mines as representative. A joint meeting with the Coal Controller and the J.W.C. on 4-1-1967 to secure a reduction of the total number made available for our selection, by which only the cost examination part of our inquiry could be completed within the short time allotted to us, did not secure agreement. However, these discussions confirmed the findings of the Coal Price Revision Committee (1958) that the units in this industry were so heterogeneous, that the costs even in the same mine could vary so much from stage to stage of development and with different degrees of mechanisation, that a truly representative sample would be well nigh impossible to secure.

4.4. The main criticism of the Coal Controller on the list furnished by the J.W.C. was that it included an unduly large number of high cost units, and that the average O.M.S. (output per man-shift) was significantly below the average reached by the industry as a whole during 1965-66. (Our cost examination has by and large established the correctness of this criticism). Whilst his list gave an average of 0.55 tonnes and consisted of reasonably efficient mines, against the national average of 0.57 which was expected to improve in the next few years, the average O.M.S. of the selection of the J.W.C. was lower.

4.5. We decided finally that we should cost all the collieries in the two lists, and also add one more colliery (Kargali) of the National Coal Development Corporation in the public sector. This made 40 altogether; and the number increases to 66 if all the individual mines in the Singareni Collieries are treated as units. As regards the Coal Controller's view that the list of the J.W.C. contained some mines,

which on account of adverse conditions or otherwise were high cost, we decided on the advice of our Senior Cost Accounts Officer, to cost them and isolate the elements of cost arising from the adverse conditions, and then take a view on how to use these costs after they were actually ascertained. We also selected 60 more mines (to bring up the total number to 100) with a view to broadening the data by estimating the approximate costs of these additional ones, not on the basis of an examination on the spot by our Cost Accounts staff, but on data furnished by the producers in response to a special questionnaire.

4.6. As it turned out we were able to directly cost only 37 of the 40 collieries selected by us since three could only furnish incomplete or doubtful data. Of the 60 others for which cost information was to be collected, only 17 supplied us with the data required by us in reasonable form and correctness despite numerous efforts both by us and the J.W.C. It was put to us at the open inquiry that this might have been because the collection of cost figures in the shape required by us would require time and the services of a few accountants. This may be true, but apart from the fact that no difficulties were explained to us or assistance sought, we would have expected that the five months' time we had given and the importance of the matter to the industry should have evoked the necessary co-operation. It suggests that an adequate costing system is not maintained by them. We can only presume, either that the collieries are reluctant to divulge their figures, or alternatively, and this is more likely, that they are content to have their costs assessed on the basis of the 40 selected by us for detailed examination.

4.7. We also decided that since the Singareni coal mines were worked as a unit by the Singareni Collieries Ltd., and prices for this isolated area would in any case be different from that of the other coal bearing areas, we should cost all the mines of this company as one unit.

4.8. In the result, the cost examination covers 24 units in Bihar and West Bengal, 11 in Madhya Pradesh and Maharashtra and one each in Assam and Andhra Pradesh with

a total production of 6.77 million tonnes, 2.78 million tonnes, 0.48 million tonnes and 4.05 million tonnes respectively in each of the four areas. These we consider would be a fair sample of the industry, and the patterns of the cost data collected by us has confirmed this view. This will be clearer from our chapters later in this Report on actual costs as determined by our Cost Accounts staff.



Chapter 5

FEATURES OF COAL MINING INDUSTRY

5.1. *Occurrence of coal.*—Geologists classify the coal bearing strata in the country under two main heads—the Gondwana (Permian) measures, and the Tertiary measures. The principal workable deposits of the former series occur in Bengal, Bihar, Madhya Pradesh, Orissa, Maharashtra and Andhra Pradesh, and are estimated at some 82,000 million tonnes, while about 2,000 million tonnes of lignite occur in Neyvelli and Palana areas. The Tertiary measures occur in Assam, Jammu and Kashmir and Darjiling areas, and are estimated at about 3,000 million tonnes. The total reserves of coal in India, as estimated by the Committee on Assessment of Resources, including those estimated by the Geological Survey of India so far, are about 87,000 million tonnes (upto a depth of 609 metres in seams of thickness of 0.45 metres and above). Over 90% of the estimated reserves are non-coking coal, and the rest coking coal. The position, therefore, is one of ample non-coking coal and very limited coking coal which occurs almost entirely in the three coal fields of Bihar and West Bengal (*viz.*, Jharia, Raniganj and Bokaro), while the use of the high sulphur coals of Assam with strong coking properties has yet to be established, though laboratory experiments have been successful. We deal more fully with coking coal in Chapter 14.

5.2. *Structure of coal mining industry.*—The total output of 70 million tonnes of coal in 1965-66 was produced by 826 collieries spread over about 30 districts and nine States (excluding Madras which produces lignite) lying mainly in Bengal and Bihar which account for 73 per cent of total production and all the coking coal, save a small quantity in Assam. Seventynine collieries (8%) are in the public sector, and contribute 23% of total production. Of these, the Singareni collieries which have a trifling private investment accounted for 27 mines and 6% of the production of the public sector. The private sector covers 92% of the collieries and contributes 77% of the production.

5.2.1. West Bengal contributes 28.3% of the national output, and Bihar 44.6%. Considered by coalfields, the most important are Jharia contributing 27.4%, Ranigunj 31.4%, Karanpura 8%, Korba and Rewa 9.9% and others with lesser amounts.

5.3. *Size of mines.*—By size of colliery, the spread in 1965-66 was as follows :—

TABLE 1
No. and % of mines and % of total output produced

Monthly output in tonnes	No. of mines	% of mines	% of total output
Below 1000	257	31.0	1.0
1000—5000	259	31.3	11.0
5,000—10,000	112	13.6	13.7
10,000—25,000	145	17.6	39.0
Above 25,000	53	6.5	35.3
TOTAL	826	100.0	100.0

It will be seen that collieries with a monthly production of less than 1,000 tonnes account for only 1% of total production, and those with above 10,000 tonnes for over 74%. Supply and prices are therefore influenced by collieries producing 10,000 tonnes and above, though the group producing 5,000 to 10,000 tonnes per month is of significance. The simple average of production per mine is about 7,000 tonnes per month.

5.4. *Methods of mining.*—The choice of method of mining depends on geological features and technical assessments of the cheapest and best method to be adopted. However, in India, tradition and current practice in the region strongly

influence the preferences, while the size of the capital investment necessary is a major factor in any decision. Mainly, the methods adopted in India are :

- (1) Open cast working;
- (2) Bord and Pillar working, with variations like Hall and Pillar;
- (3) Longwall (advancing and retreating); and
- (4) Horizon mining.

Stowing of voids with sand is adopted in conjunction with methods (2), (3) and (4), partly for safety and partly to secure maximum extraction.

5.4.1. *Open casting*.—This method is possible only when coal is near the surface, and under favourable geological conditions it can be the cheapest system of recovery, since once the strata over the coal (*i.e.* the overburden) are removed mining becomes mere quarrying. Coal so recovered has increased from 12% of total production in 1955 to 20% in 1963. Most of this increase of open casting is due to the National Coal Development Corporation.

5.4.2. *Bord and Pillar*.—This is the most popular system in India, in which a shaft (*i.e.*, a vertical entry) or an incline is sunk to reach the coal, and galleries are driven at regular intervals, usually at right angles, leaving pillars to support the top strata. The pillars are extracted by “depillaring” while retreating, after development of galleries is complete, and usually with sand stowing. The reasons for the widespread use of this system are historical, since this was the British system at the time coal mining was developed in India at the end of the 19th century.

5.4.3. *Longwall mining*.—In this system, after coal is reached by a shaft the working face advances in a continuous line in one direction, towards the boundary of coal (“advancing”), or back from the boundary reached through galleries (“retreating”). This system gives rapid increases of output and is better amenable to mechanisation than the Bord and Pillar system. It is becoming increasingly popular, due to the economies of recovery through mechanisation.

5.4.4. *Horizon mining*.—This consists of sinking shafts to points below the coal seam to be exploited, and then driving drifts (*i.e.* roadways) through the strata to meet the seam. The system is popular in Holland and the Ruhr in Germany, but involves locking up capital in dead work before the seam is reached. Fast methods of transport like underground locomotives are needed, and economies are available only if there is a large output over a long period such as would justify the heavy long term investment. Only one mine of the Indian Iron and Steel Company, Chasnalla, in Bihar is worked by this method.

5.4.5. Various refinements in the last two systems are possible, including the recovery of a seam from top to bottom or vice versa. The French method of recovery from top to bottom in the longwall system, which economises on stowing is being tried experimentally in the Chasnalla mine of the Indian Iron and Steel Company. This method reduces costs of stowing by allowing the overburden to collapse on horizontal nettings at horizontal intervals as the mining proceeds downwards progressively.

5.5. *Cost structure*.—The cost structure as worked out from the balance sheets' data of the Reserve Bank for 45 selected companies reveals the following position :

TABLE 2
Cost structure

(in percentages)						
Year	Wages & salaries	Raw materials	Excise duty & cess	Other expenses	Depre- ciation	Gross profits
1960-61 . .	52.1	21.9	0.5	12.5	3.8	9.2
1961-62 . .	52.0	21.8	0.5	13.4	3.8	8.5
1962-63 . .	51.1	21.3	0.5	14.1	3.5	9.5
1963-64 . .	53.4	21.3	0.4	12.4	3.8	8.7
1964-65 . .	54.8	21.8	0.3	12.6	4.2	6.3
1965-66 . .	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

We have examined the financial position of the industry in another chapter.

5.6. *Trends in employment, mechanisation and production.*—Available data in respect of employment, mechanisation and production are briefly as follows :—

TABLE 3

Employment, mechanisation and production

(Figs. for production in million tonnes)

Year	Production	No. of workers in '000	Coal cutting machines		Mechanical loaders		Mechanical conveyors	
			No. in use	Pro- duc- tion	No. in use	Pro- duc- tion	No. in use	Pro- duc- tion
1960	52.6	380	582	14.2	11	0.6	93	2.8
1961	56.1	319	626	14.9	17	0.9	112	4.2
1962	61.5	417	696	17.2	16	0.7	135	4.9
1963	66.9	433	742	18.8	17	0.7	153	7.1
1964	64.0	414	748	18.8	14	0.6	153	6.1
1965	69.5	407	804	23.9	24	1.2	153	7.9
1966	70.5	N.A.	958	22.7	40	1.3	127	8.1

We deal more fully with the question of mechanisation elsewhere.

5.7. *Productivity—Annual output per worker.*—Productivity in the industry is largely dependent on the state of mechanisation in respect of recovery, and of loading and transport of coal, since manual workers at the coal face work on piece work rates. The output per person employed can only be regarded as an indication of productivity, since the method of calculation varies from mine to mine, and workers not directly connected with recovery of coal are often included in the figures, e.g. hospital workers, school teachers and staff

in housing colonies. The following table shows the trend in productivity of labour and machinery employed in coal mining in India :—

TABLE 4

Annual output per worker/machine employed

Year	Per worker (in tonnes)	per machine (in '000 tonnes)		
		Coal cutting machines	Mechani- cal conve- yors	Mechani- cal loaders
1960 . . .	138	24.2	29.2	55.7
1961 . . .	141	23.8	37.6	53.8
1962 . . .	148	24.4	36.1	45.6
1963 . . .	155	25.4	46.5	40.9
1964 . . .	155	25.2	40.3	38.9
1965 . . .	171	28.3	51.6	52.5

5.8. *Special characteristics.*—Five well-known features of the coal industry have an important bearing on prices and price policy. Firstly, coal is not a homogeneous product, but a series of allied commodities each with its own characteristics and specialised uses, and its own demand and supply conditions. Coking and non-coking coals, which are the broad groups, can only be substituted, each for the other, at a loss of one nature or another. A second feature, with which we deal more fully elsewhere, is the wide differences in the efficiency of producing units, and in the problems they have to face. Thirdly, coal is a wasting asset, and the closing down of working pits as they become too expensive to work or get exhausted, and the opening of new pits, is an essential part even of maintaining existing production. Continuous

investment of new capital is unavoidable in the industry whether production increases or just remains stationary. Fourthly, once a mine has been opened it is desirable to work it fully to exhaustion. Any long stoppage half way may lead to flooding or collapse and result in a total loss of exposed coal. Last and most important, the product is bulky and transport costs are high in relation to pit-head prices. What the consumer buys is coal-plus-transport. This gives locational advantages to mines which may sometimes render a high cost mine more beneficial to the economy of the country than a low cost one. The Singareni Collieries are a good example of this characteristic of advantage of location.

5.9. *Miscellaneous.*—We deal with production, demand and estimates for the future elsewhere in this Report, as also questions like price trends. At present about a sixth of the production goes to the steel industry, a sixth to the electricity industry, and a fourth to the railways. These three consumers, therefore, take up nearly 60% of the country's production of coal. A large potential demand exists in the domestic sector to which we devote some attention elsewhere, and if this demand is exploited, it would revolutionise the industry, and be of lasting benefit to agriculture and forestry.



Chapter 6

PREVIOUS HISTORY OF PRICES

6.1. *Prices prior to C.P.R.C. Report.*—Control over coal prices was first introduced in 1944; until then they were governed by the market viz., the normal forces of supply and demand and contemporary financial and economic circumstances. They had fluctuated widely over the course of the previous twentyfive years. Thus in 1922 they had averaged Rs. 8 per ton, fallen to Rs. 2.50 in 1935, gradually risen to Rs. 4.44 in 1942, and risen again to Rs. 11.44 in 1943. Output rose and fell sharply in response to these price changes. Many collieries unable to stand competition closed down, whilst others survived with slaughter exploitation.

6.1.1. *Prices during 1944-47.*—The war years of 1942-45 brought about a coal famine. Coal was brought under control in 1944 to arrest the decline and boost production. The rates quoted by the Calcutta Selected Coal Association, with due allowance for current wage costs, were made the basis of the controlled prices, and the prices fixed secured an adequate margin of profit to the collieries. They were enforced as “fixed” prices, and not “ceiling” prices to prevent unhealthy competition, and consequent wasteful forms of mining. Initially they were fixed for three sizes and six grades, but subsequently revised to two sizes with an increased differential between the sizes. The reduction of sizes from three to two was to check the increasing tendency to despatch all coal as “run of mine” which gave the collieries the largest profits. In 1946 following labour discontent, wages were increased on the basis of a report of a Conciliation Board, and as promised to the industry, a Committee was appointed to examine the costs of production of a few representative mines and to suggest revised prices for coal. Prices were revised accordingly in July, 1947.

6.1.2. *During the period 1948 to 1955.*—In 1948 it was found that some producers were selling Grade III coal

below controlled prices, which suggested that they were perhaps high. A Price Revision Committee was appointed to examine the prices of Grade III A and IIIB. Their report resulted in reduction of prices of these grades. There was another downward revision of prices in November 1949 covering Grades upto II together with similar action in respect of other basic commodities as part of an anti-inflationary drive. In early 1954 it was noticed that large rebates were being offered by many collieries for Grade II, and a second reduction was effected in the controlled prices of this Grade.

6.1.3. *During 1955-59.*—In July 1955 an increase of three annas per ton, i.e., 19 p., was allowed in the prices of selected A and B and Grade I coals to compensate the industry for increases allowed in provident fund contribution to labour. In November 1955 this increase was applied to coking coal to compensate for disabilities of coking coal producers whose production was “pegged” to conserve coking coal. In May 1956 an increase in the emoluments of labour was made on the Award of the Industrial Tribunal generally known as the Mazumdar Award after its Chairman. A Committee had been appointed to consider revision of prices a little earlier in December 1955 in the anticipation that the Industrial Tribunal’s Award would significantly increase the costs of production. On the recommendation of this Committee coal prices were increased subsequently by a uniform Rs. 3 per ton in the Bengal/Bihar area, and Rs. 2 to Rs. 5 elsewhere. Meanwhile some labour unions appealed against the Mazumdar Award and secured certain increases in wages; as a result coal prices were increased again by Rs. 1.50 in July, 1957.

6.2. *The C.P.R.C. Report.*—All these earlier increases in prices, it will be seen, were mostly the consequence of labour awards. The industry had, however, been urging that other costs had also gone up, particularly in respect of stores and working conditions which necessitated deeper mining, with the exhaustion of coal at higher levels. Besides safety measures, fringe benefits, freight rates etc. were also increasing costs. The Coal Price Revision Committee—generally known as the Bhoothalingam Committee after its Chairman (hereinafter referred to as C.P.R.C.) was then appointed on 3rd May 1957 to examine the costs of production of coal and coke

and to recommend changes in the existing price structure. The prices today are essentially based on the structure evolved by this Committee, which for the first time made a detailed examination of the costs of production of a large number of representative mines.

6.2.1. The C.P.R.C. selected 36 collieries for detailed examination of costs by a Cost Accounts Officers team, and obtained cost information from 30 more. It adopted the following heads for a break-down of the cost of production :—

- (1) Wages of colliery workers, comprising basic wages, dearness allowance and other allowances, bonus, provident fund, workmen's compensation, and the concessions allowed under the Mazumdar Award.
- (2) Salaries of Staff (other than colliery workers).
- (3) Stores.
- (4) Overheads—(a) Power
(b) Royalty
(c) Cess
(d) Other miscellaneous items
(e) Labour amenities and Coal Mines Regulations.
- (5) Depreciation.
- (6) Administration.

The Cost Accounts Officers also worked out the net profit or loss per ton of coal expressed as a percentage of (i) the paid-up capital per ton (ii) the gross block per ton (iii) the capital employed and (iv) the sales realisation per ton.

6.2.2. The C.P.R.C. decided to treat the cost accounts report for the Bengal-Bihar area, which then produced 80 per cent of all coal, as providing the basic data, and to treat the outlying fields of Madhya Pradesh, the former Bombay state, and Orissa as an area for separate treatment because the coals there had not been graded at the time. The collieries of

Assam and Andhra Pradesh, were treated as classes apart since they are far from the Bengal/Bihar area, and on other considerations they were best dealt with on their own merits.

6.2.3. The C.P.R.C. found, however, that even as regards Bengal/Bihar the data revealed wide variations in the same elements of cost and even in the same coal-field. They also found considerable variation in output per man shift (O.M.S.) even among collieries with more or less similar conditions of working. They therefore came to the conclusion that a mere striking of averages would not be appropriate. A technical examination designed to discover why actual costs varied so widely was, therefore, made by the Coal Mining Adviser to the Department of Mines and Fuel, and the Chief Mining Adviser to the Railways. The Report of these officers covered such factors as nature and depth of seams, geological conditions, presence of water and gas, conditions of roof, need for timbering, and the extent of mechanisation. A re-examination of the cost data in the light of the report of the technical team reinforced the view of the C.P.R.C. that the computation of fair costs by averaging would be definitely inappropriate.

6.2.4. The decision taken by the C.P.R.C. is best put in their own words :—

“We felt that it would be more appropriate to attempt an assessment of what might be regarded as ‘normal’ for each main item of cost; in other words, that a mere examination of costs actually incurred by various collieries would not be enough and the objective should rather to be determined, by a study and comparison of actual costs, the cost of production, as it should be, in a colliery managed with reasonable efficiency and economy and facing no problems of special difficulty. In making such an assessment, we considered that along with the conditions which actually prevailed during the period of costing, it would be equally necessary to take note of later trends of production and development and the conditions necessary to achieve the target of production set for the ~~Second~~ Five Year Plan. Expressed in

a different way, the concept of 'normal' should relate to a colliery working with reasonable efficiency and economy not only to maintain production but also to expand production at the rate envisaged under the plan.

"In the light of the considerations set out in the preceding paragraph, we now proceed to assess the 'normal' costs under the following heads :—

- (1) Wages.
- (2) Provision of labour amenities and implementation of the Coal Mines Regulations.
- (3) Salaries and expenses on administration.
- (4) Cost of stores.
- (5) Cost of power, royalties, cesses, collieries' own consumption of coal and other 'miscellaneous items'.
- (6) Depreciation.
- (7) Brokerage and Commission."

6.2.5. The C.P.R.C. then examined the cost data collected by them, and fixed the 'normal' wage cost on the basis of the working of 18 of the 26 collieries costed which showed a relatively narrow range of variations in the wage cost per ton. This was adjusted on a proportionate basis to allow for the difference in the average O.M.S. of the costed collieries, and the all-India average O.M.S. during 1956-57, as also the incidence of the Appellate Award on wages. Similar norms were arrived at for other elements. On the important issue of depreciation, the C.P.R.C. found that the capital employed at the beginning of the II Plan was approximately Rs. 14 per ton of coal and estimated that the additional capital required for expanding production in the manner envisaged by the private sector would be Rs. 20 per ton. Averaging the capital over the contemporary production of 35 million tons, and the required additional production of 10 million tons, the total capital employed, including investment for additional production, was worked out at Rs. 16

per ton. An addition of Rs. 4 was made for future development, representing the special provision for development rebate existing in the tax structure. Taking the average life of all types of assets to be 12 years the allowance for depreciation and development was fixed at Rs. 1.70 per ton. The total price arrived at was then recommended to be kept stable "over a reasonable period of a minimum of 5 years, subject however to revision on the basis of increase in the wage element".

6.2.6. There remained the issues of stowing and of special assistance for collieries handicapped by one or other kind of adverse factor like gassy nature of the mine, depths of workings, geological conditions etc. The costs of stowing the C.P.R.C. recommended, should be met in full, and not to the extent of 75 to 85 per cent as previously, subject to a ceiling to ensure economy in expenditure. The required subsidies were to be met by increasing the stowing cess on coal to the order of Rs. 0.25 per ton. So also additional costs due to adverse conditions were to be subsidised by the Coal Board which would examine these costs in detail, out of a fund created with an additional cess of Rs. 0.25 per ton on coal.

6.2.7. The next issue of importance for the C.P.R.C. to consider was whether the prices should be "fixed" or "ceiling". The Government had imposed "fixed" prices in 1944 to end the cycle of over production, prevent cut-throat competition and check uneconomic prices between 1920 and 1944, and to secure stability and orderly progress in the industry. The Indian Coalfields Committee in 1946, had come to the following conclusions :—

"We turn now to the question of control over coal prices. We have shown in earlier chapters how unfavourably the low prices for coal which prevailed some ten years ago, reflected on mining practice, and we feel that it is essential that the price of coal should not again be allowed to fall to uneconomic levels. The opinion is supported by the fact that we are advocating in this report that every effort should

be made to increase the production of coal in order that the increased industrialisation of the country, which is now planned, may become possible."

The Working Party for the Coal Industry in 1951 endorsed this view in the following words :—

"We have also had the experience of the years 1943 to 1946 when there was serious shortage in coal production caused, in our opinion, by negligence of the coal industry and the failure on the part of the industry to maintain their machinery and plant in order, to develop the mines adequately and maintain a settled and contented labour force in the coalfields. In a free economy the above conditions are likely to repeat themselves and in the interest of continuing production in the country at reasonable prices and of proper exploitation of the mining resources, we feel that steps should be taken to stabilise the coal prices and adopt measures by which not only coal is made available to the consumers at an economic price, but also the producers can obtain an economic price for their produce.

"The result of decontrol of price is likely to be an immediate fall in price that may render a large number of marginal mines to be uneconomical and compel them to close down. Such marginal mines should not be called inefficient units as the increased cost of production is due to the conditions prevailing underground caused by secondary mining operations or other factors beyond the control of the management. But such marginal mines cannot in the larger interest of the nation be allowed to be closed down, drowned and lost for ever because many of these mines may be impossible to be recovered except at abnormal expenditure. This is another reason why there should be a state of control on prices with a view to making it possible for the marginal mines to carry on."

The same view was taken by the Commodity Controls Committee in 1953.

6.2.8. The C.P.R.C. were in general agreement with this view except as regards Grade III coals where there was over production and accumulation of stocks. They observe :—

“We are in general agreement with the above views. We would add that the case for fixed prices rests on another factor as well, *viz.*, control over distribution. Transport is inadequate as compared to both demand and availability of coal. The entire distribution system has, therefore, been rationalised so as to economise transport to the maximum and to ensure that the better grades of coal are distributed to industries which need them rather than be wasted by industries which can use lower grades. Certain restrictions are imposed on movement from different coalfields with a view to eliminating available haulage and increasing the turn-round of wagons. In other words, a kind of zonalisation of the sources of supply has been made in respect of various points of consumption so that the supply of coal of a required quality is from the nearest possible colliery. It is an essential part of this rationalisation that the consumers will have to restrict their orders to the collieries in a specified zone. While such rationalisation may be necessitated by Railway operational requirements, it would be difficult to justify it except in a context of ‘fixed prices’. If a consumer can secure the same quality of coal at a lower price from any zone other than the one allotted to him, rationalisation will not permit him to get that coal, and the freedom given to him under a system of ‘ceiling’ prices would be largely illusory. It was in view of this that the Railway Board observed as far back as 1952 that decontrol of the prices of coal would be inopportune when rationalisation of coal movements is sought to be achieved to the largest possible extent.

“Wages and profits also are inextricably linked with prices and all these three elements taken together are the determinants of stability in the industry. It would be unrealistic to disassociate the price

element from these and to take a decision in regard to this separately. The extent to which wages have become closely interlinked with prices will be seen from the fact that a price increase of Rs. 3 was given in 1947 to enable the industry to implement the Conciliation Board Award. Another increase of Rs. 3 was given in July 1956 in connection with the Industrial Tribunal Award and then again a further increase of Rs. 1/8/- per ton in July, 1957 in connection with the Appellate Tribunal Award. A further increase of Rs. 12 per ton has been given only very recently on May 17, 1958 to enable the industry to pay enhanced dearness allowance to workers. Thus an element of as much as Rs. 8/4/- in the price structure is connected with wages to labour, and, if price control is removed, there is the danger of attempts being made to lower the level of wages which are statutorily fixed. The result may be straining of the employer-employee relations with its repercussions on production.

“The case for ceiling prices rests on general considerations. The main argument is that the consumer should have a choice, as only so he can be certain of getting the right quality of coal he requires. If for any reason the quality offered is lower than what he needs, he should have the choice of paying a lower price or getting better coal. It is argued that there is no better guarantee against the supply of inferior quality than competition. All this would indicate that unless there are other valid reasons, controlled prices should be the ceilings. It would, however, be seen that in the case of the coal industry, such special conditions do exist. All the Committees which have gone into this question previously have unanimously come to the conclusion that the maintenance of a system of fixed prices is necessary. After carefully considering the matter, we agree that essentially this policy should be continued. In our opinion a system of ceiling prices can be operated only in conditions where the consumer has a choice of the source of supply. The crucial

question, therefore, is whether in the coal industry all consumers can be given this freedom of choice. The answer is clearly in the negative. We would emphasise in particular the necessity to confine the distribution of metallurgical coal to those who cannot do without it. It is the objective of Government's policy to achieve this state of affairs as soon as possible. For this purpose, it is not enough to prescribe that metallurgical coal shall be supplied only to the steel industry and a few others who need it. It is equally necessary to allocate the sources to individual units, taking into account not only the convenience of transport but also a fair distribution of the various qualities available. The establishment of coal washeries increases this necessity. These considerations apply, though perhaps with slightly less force, to other high grade coals as well. For these reasons we consider that, by and large, the system of fixed prices should continue.

“We find, however, that in the case of Grade II coals, it might be practicable to give a certain freedom of choice to the consumer. In relation to demand, supplies are generally adequate. In fact, there is some over-production of lower grade and the greater part of pit-head stocks in collieries consists of these grades. We have already pointed out that the prices of Grade III coals might be able to bear some reduction. This can best be brought about by a limited competition. The only limits we have in mind will be those set by rationalisation of movement. Subject to this, the consumer will have a free choice of sources of supply. With such a choice he will be in a better position to obtain the right quality of coal and negotiate prices. For these reasons, we have recommended earlier that, as an experimental measure, the prices of Grade III coals in the Bengal-Bihar area be notified as the ceiling prices. After experience is gained of the practice of this method, the question of extension of this system to other areas producing low grade coals can be considered.”

6.2.9. Prices were settled for coals of the three other regions on identical considerations.

6.2.10. On the issue of grading, the C.P.R.C. recommended the grading of the coals of outlying areas, and of Andhra Pradesh on an "ash plus moisture content" basis, partly because it was illogical that coals of varying qualities and fuel values should bear the same price and partly because it was desirable that consistency of supplies should be assured to the consumers, particularly to the Railways whose locomotive efficiency could be impaired by fluctuations in quality of their supplies. Apart from these considerations the Committee took the view that grading would encourage improvement in the quality of coal produced and despatched, encourage consumers to draw requirements from the outlying fields and reduce excessive dependence on supplies from Bengal-Bihar, thus saving costs of transport, haulage pressure on railways, and ensuring regularity of supplies in a vastly expanding market. This recommendation was accepted by the Government in respect of the outlying coal fields, but not of the Singareni collieries. As regards the Assam coal mines which numbered about 300, almost all small and worked manually, and mostly exploited by owners and members of their families, no grading was recommended.

6.2.11. The recommendations of the C.P.R.C. were implemented in the latter half of 1959, and the recommended structures continued till 1961, with price increases to meet increases in wage costs. In 1961 there was an apprehension that production of superior grade coking coals would fall without some incentive for extra production. It was further felt that the differences between superior and inferior grades of coking coal should be widened. A new price structure for coking coal was, therefore, evolved with effect from 20-2-1962, the previously existing grades of Sel. A, Sel. B, Grade I and Grade II being replaced with 12 categories A to L, for coking coal the range of ash percentage between category and category being reduced to only one per cent. Substantial increases of price were made to discourage consumers who could do with lower grades from purchasing higher grades which were becoming scarce. Thus for example, the prices of revised grades A, B, and C of coking coal which

covered the old Sel. A went upto Rs. 26.25, Rs. 25.25 and Rs. 24.25 from Rs. 23.30, and that of the lowest grade fell from Rs. 20.30 to Rs. 19.25.

6.3. Reports of Study Group on Coal Prices.—The next study of the structure of coal prices—a summary one—was made by an interdepartmental Study Group presided over by Shri T. Swaminathan appointed on 27-5-1963 with the following terms of reference :—

“(a) To examine and report whether, taking into consideration the recent concessions and facilities granted to the coal industry, such as a higher development rebate, a reduction in import duty on specified items of machinery and equipment simplification of procedure for grant of subsidies in adverse mining conditions, an increase in prices of coal and coke is necessary for attaining the following objectives :—

- (i) progressive increase in coal production, and
- (ii) adequate and timely development of mines to provide the base for further increased production,

“(b) To suggest in what manner the incentive of a price increase can be channelled directly towards (i) increased and more efficient production including modernisation and mechanisation of mining methods, (ii) development of deep mines, (iii) improved productivity;

“(c) To recommend, as corollary to the above, in what manner any price increase proposed can be specifically limited, in effect, to the encouragement of modernisation and mechanisation of mines and the development of deep mines, without affording encouragement to inefficient mining methods or mining to shallow depth only.”

6.3.1. The Group made a quick enquiry and recommended amongst other things :—

- (1) Fuller use of subsidies to difficult mines to encourage investment in mechanisation.

- (2) The extension of such subsidies till then restricted to Sel. and Grade I coals, and thin seams of Grade II and III in Madhya Pradesh, to Grade II coking and blendable coals.
- (3) The extension of development rebate applicable to collieries (which had recently been increased from 20 to 35 per cent) to washeries.
- (4) An expansion of the list of mining equipment eligible for reduction of import duty.
- (5) An increase in prices based on a quick study by a Cost Accounts Team of published accounts of 17 companies furnished by the joint Working Committee of the four Colliery Association.
- (6) A changeover by the railways to lower grades of coal, and
- (7) A bonus to collieries agreeing to sampling and inspection of superior grades of coal at the consumer's end.

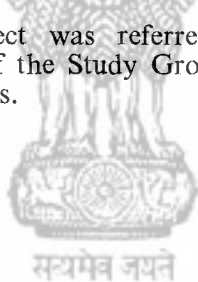
6.3.2. Meanwhile prices and costs have gone up from time to time due to wage increases, increased variable dearness allowance, profit sharing bonuses etc. Since the industry had been agitating for neutralisation of increases of costs, a Study Group under the Chairmanship of Shri A. B. Ganguli was appointed on 26th March 1966 with the following terms of reference :

- “(a) To review the recommendations of the Coal Price Revision Committee (1958) in the light of the present day conditions by comparing the cost data and norms worked out by the Coal Price Revision Committee with the present day conditions and estimate the increases that may have taken place in the cost of each factor which enters into the cost of raising coal;
- “(b) To examine how far the rise in costs has been neutralised by the increase in prices which have been allowed from time to time; and
- “(c) To recommend if any further increase in price of coal and coke is called.

6.3.3. Prices were increased on 22-2-1966 on the basis of the Report of this Study Group, including an element of Rs. 0.37 for a period of a year to amortise arrears of bonus payable under the Payment of Bonus Act, 1965.

6.3.4. We give in Appendix IV A and B the price increases granted by the Government from time to time for non-coking and coking coal of the Bengal/Bihar region with brief reasons for the increases. Of the 30 price increases granted for non-coking coal over a period of 11 years all except four were to neutralise increases of wages or bonus or other forms of emoluments to labour. As regards the four exceptions, two increases were granted on 13-6-1962 and 3-3-1964, the first one to give an incentive for increased production of superior grades of coal, and the second partly to neutralise cost increases, other than those due to payments to labour, and partly as a production incentive. The remaining two on 29-12-1961 and 3-2-1966 were to offset royalty increases.

6.3.5. The subject was referred to the Commission whilst the enquiry of the Study Group referred to in para 6.3.2 was in progress.



Chapter 7

ASSISTANCE TO THE INDUSTRY

7.1. Since a Study Group has been appointed by the Government of India to examine the question of subsidies in detail, we offer only some general remarks on matters which have come to our notice, to the extent they have a bearing on prices. Subsidies are both an incentive to greater production and a reimbursement for essential work, and arise out of the fact that the income of the collieries accrues from a controlled price system which has the objective of maintaining adequate production without casting undue burdens on the economy.

7.2. *Agencies for assistance.*—Collieries receive financial assistance from two different agencies, the Coal Mines Labour Welfare Fund and the Coal Board. We are not concerned in this inquiry with the assistance from the former which covers matters like housing, water supply, medical service, education and so forth. We would only remark in passing that some infructuous expenditure occurs in the matter of welfare adding to the costs of coal without any consequential advantage. The effects, if any, are probably marginal, but having noticed such infructuous expenditure, we have considered it desirable to suggest that welfare programmes should be framed with care, and cautiously and progressively expanded to the extent that advantage will be readily or immediately taken of them. This type of assistance is really assistance to the worker, though indirect benefits will eventually accrue to the industry through improvement of the health and contentment of the worker.

7.3. *Types of financial assistance.*—Direct assistance to the industry arises out of schemes for financial assistance to collieries in respect of (i) stowing and (ii) special assistance for adverse mining conditions. In addition, there is at present a subsidy on transport cost in respect of coal movements by sea to the south of India which is distinctly more expensive in comparison to rail transport which would be the normal mode of transport. The excise duty on coal is levied

at present at the rate of Rs. 1.68 per ton and recovered by the Railways at the loading point on all despatches from the collieries. It is initially made over to the Government of India and apportioned as under :—

(a) Stowing	Re. 0.63
(b) Difficult mining	Re. 0.25
(c) Coastal shipments	Re. 0.80

TOTAL	1.68
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The collections credited to the Consolidated Fund of the Government of India are released to the Coal Board in the shape of grants for each head of assistance separately. The element of Re. 0.80 per ton intended to meet the extra cost of transport by sea was settled on the expectation that coal would be shipped annually to the order of two million tonnes. In practice it has been much less.

7.3.1 *Sand stowing*.—The subsidy for sand stowing based on the report of the Coal Mining Committee of 1937 was originally intended to secure safety in the mines. However, that Committee saw the close connection between safety and conservation and emphasised the importance of sand stowing to conservation of our resources of good quality coal. The decisions taken by the Government of India on the recommendations of that Committee are embodied in the Coal Mines Safety (Stowing) Act. Since 1938 collieries which are compelled to recover coal by stowing, or which voluntarily do so after securing the approval of the Coal Board, are assisted in respect of the extra costs they thereby incur. The Indian Coalfields Committee which went in to the matter from the overall point of view of conservation and safety recommended that subsidies should meet 75 per cent of the cost with a maximum of Rs. 2 per ton. The intention from the very beginning was that the expenditure on stowing should be almost fully met by the subsidy subject to a maximum or ceiling set solely for the purpose of preventing wasteful or extravagant expenditure. Till 1960, the Coal Board was subsidising upto the extent of 75 to 85 per cent of the stowing costs actually incurred. The Coal Price Revision Committee which reviewed the subject came to the conclusion that “it is not only necessary to provide for the stowing costs to be

met but to pay it in such a way that there will be no disinclination to adopt stowing." The Committee therefore recommended that stowing costs should be met in full, though a maximum limit per tonne could be prescribed to ensure economy of expenditure on stowing. It also recommended that the necessary additional funds should be found by suitable enhancement of stowing cess which then stood at Re. 0.25 per ton.

7.3.2. *Special assistance for adverse mining conditions.*—

The Coal Price Revision Committee went into the question of adverse mining conditions as well and came to the view that though the price structure recommended by it was sufficiently flexible to absorb minor variations in normal working conditions, there were a few collieries which were handicapped by one or other kind of several adverse factors which inevitably tended to raise the cost of production significantly. Since the economy of coal was controlled then as it is today, the Committee decided that it was neither necessary nor desirable to raise all prices to a level sufficient to maintain these units of production, many of which produced superior grades of coal, and recommended subsidies determined in each case on their requests and revised from time to time. Special assistance is now granted to coal mines handicapped by the following adverse factors :

- (a) gassy nature;
- (b) depth of shaft;
- (c) inclination of seam;
- (d) pumping costs;
- (e) thinness of seam; and
- (f) high transportation costs from pithead to railhead.

Certain scales of assistance are available to compensate for adverse conditions in both underground and open cast mines at rates prescribed by the Central Government. The procedure for obtaining the special assistance is provided in paragraphs 79 to 82 of the Coal Board Manual.

7.4. *Criteria for financial assistance.*—The following principles govern the consideration and disposal of each case for grant of subsidy. It should be established that continuance

of production from a colliery which asks for assistance is necessary in the national interest. The Coal Board is required to examine each case on merits with reference to the quality of the coal produced, the level of production, the extent of workable reserves, etc. Secondly, it should be established that the adverse factors will result in raising the cost of production. Payment is limited to a period of six months and continuance depends on a fresh examination in the light of any change in the circumstances since the last examination. Besides, subsidy is restricted to a seam or a section of a seam which qualifies in respect of adverse factors and the grant is admissible only to the grades of coal which qualify for subsidy.

7.4.1. It will be noticed that though sand stowing and adverse conditions of mining are dealt with under two separate heads, the intention is in both cases that the extra costs over and above the normal mining costs should be met in full by the Coal Board provided the stowing or the production of coal as the case may be is in the public interest. It is against this background that complaints are made by producers.

7.5. *Complaints regarding assistance.*—Complaints regarding subsidies are in relation to :—

- (i) the routine of procedure involved, and the consequent delays in payment of granted amounts; and
- (ii) the quantum of subsidy eventually awarded.

7.5.1. *Procedure for assistance.*—As regards procedure, the complaint is that too much time is taken in the verification of claims, even though the staff of the Coal Board frequently visit the mines in course of their operations expressly to verify that the basis of the claims exists. A scheme of an 80 per cent "on-account" payment appears to have been tried for some time subject to collieries producing bank guarantees, but it was abandoned since the time saved was not appreciable and the expenses on the guarantees did not appear to the collieries to be worthwhile. Apart from the delays in paper work, one reason for the long time taken to pay admitted amounts appears to be the shortage of funds with the Coal Board. The present practice, as already stated, is for the cess collections to be credited to the Consolidated Fund of the Union and for finance being placed at the disposal of the

Coal Board through allotments in the annual budget and Government sanctions from time to time against these allotments. These sanctions are delayed and often inadequate. There is evidently a large balance left in the Consolidated Fund. One other reason for inadequate utilisation of the funds is that the cess is granted to the Coal Board under three different heads of (a) stowing, (b) adverse mining conditions and (c) transport, even though all these three payments are in the final analysis intended to meet extra costs of production of delivery which the price structure does not cover. It has so happened that while there was a balance under one head, the allotment under another had been fully utilised. Thus, while there is a shortage now of the portion of cess earmarked for adverse conditions, there is an accumulation under the transport head of over ten crores of rupees due to shortfall in the estimates of quantities of coal moved to South India by sea. An *ad hoc* Committee set up by the Coal Board to review the scheme for grant of financial assistance to collieries reported that the funds were not sufficient to meet commitments because of the recent increases in the proportion of coal obtained by stowing and under difficult mining conditions with the progressive exhaustion of deposits where mining conditions may be said to be normal.

7.5.1.1. The following table shows the net proceeds of excise duty collected under the Coal Mines (Conservation and Safety), Act, and of amounts placed at the disposal of the Coal Board :

TABLE 5
Collections and Disbursements of Excise Duty on coal
(in lakhs of rupees)

Year	Collections by Govern- ment	Payments to Coal Board	Cumulative balance
1961-62	758	380	378
1962-63	958	395	941
1963-64	1,027	450	1,518
1964-65	944	560	1,902
1965-66	1,070	700	2,272
1966-67	N.A.	1,043	N.A.

Thus a sum of over twenty crores of rupees collected for the benefit of the industry from consumers of coal remains unutilised.

7.5.1.2. We would suggest that (i) cesses for stowing and adverse conditions be treated as one head and (ii) all collections should be credited as and when made to the Coal Board for the use of subsidies which it considers earned without the need for securing grants from time to time under separate heads from the Consolidated Fund. This will speed up payments and check any tendency for the Board to cut down grants merely to equate them to the total balances available with it.

7.5.2. *Quantum of Financial assistance*

7.5.2.1. *Stowing costs*.—We have collected the figures relating to the stowing costs inclusive of wages, materials and all other elements, and the consequent losses incurred by 12 of the 37 collieries whose costs of mining coal we have examined. The following table shows the position :

TABLE 6
Incidence of stowing costs

Colliery No.	on coal raised by stowing (Rs. per tonne)	on all coal raised (Rs. per tonne)	Loss on all coal raised (in Rs. per tonne)
A	5.59	0.60	0.25
B	14.79	0.59	0.34
C	10.99	5.21	2.10
D	7.36	2.83	1.02
E	10.18	2.51	1.10
F	6.56	5.77	1.99
G	6.10	2.81	0.67
H	6.86	6.86	1.79
I	9.25	6.39	1.84
J	10.76	6.66	0.82
K	5.13	4.01	1.93
L	10.54	2.95	1.12

Considering that the margin of profit allowed in the price structure by the Coal Price Revision Committee is Rs. 1.75 per ton, the losses are of a heavy degree. One coal company, for example, estimates that its losses during 1965-66 on sand stowing were Rs. 25.85 lakhs, or nearly a rupee per tonne.

7.5.2.1.1. The Coal Board has two alternative bases for subsidising the cost of sand stowing :—

- (a) For collieries gathering their own sand, the actual costs to the extent permissible under a structure drawn up by the Coal Board, both for direct and indirect charges;
- (b) For collieries carrying out stowing operations through a contractor, the contractor's bill subject to a ceiling which is related partially to (i) the distance through which sand has to be carried and stowed, and (ii) the mode of transportation.

Each structure has a sub-ceiling or maximum on individual items or operations besides a ceiling on the total cost of stowing. This has the effect of putting a certain premium on stowing by contractors since the sub-ceilings in stowing by contractors are not amenable to the same degree of check as in the former. Thus while lorry charges for sand carried by a contractor are only subject to the lowest tender being reasonable, in the case of transport by a colliery by its own lorries the actual cost plus an allowance for depreciation alone are payable. So also whilst the costs of repair of a machine by an outside workshop are met in full, repairs done in the collieries' own workshop are not treated as an admissible item of expenditure on stowing. Setoffs against an over expenditure on one item against an under expenditure on another become difficult in the case of departmental stowing, but easier if done through a contractor.

7.5.2.1.2. The distinction between contractors and departmental work, and the interpretation of the rules has led to one case of underpayment of a sand stowing unit visited by two of the Members of the Commission and which

is worth mentioning. In the case of the Equitable Coal Company, the Bhaladih Sand Gathering Station is a separate operating unit with sand collecting equipment bunkers, wagons and locomotives. It has departmental performance costs and statements for internal management information and control, although for purposes of the Company's published accounts the sand stowing unit does not exist as a separate entity. The Bhaladih station is perhaps unique in that only 40 per cent of its present output of sand is utilised by the Equitable Coal Company's own collieries, while the remaining 60 per cent is supplied under contract to collieries of other entirely unconnected collieries namely, Chinakuri of Andrew Yule & Co. Ltd., and Dhemo Main, formerly owned by the Equitable Coal Co., but now sold out and separately owned and managed. In treating the Equitable Coal Company's claims for subsidy in respect of the 40 per cent consumption by its own collieries, the Coal Board deducts from the otherwise admissible direct costs, the total income received from outside collieries. The net effect on the Equitable Coal Co. is substantially adverse. A study of the accounts for 1965 shows that out of the total cost of Rs. 32.4 lakhs (including interest and depreciation) the direct costs amounted to Rs. 27.2 lakhs. Against this, the amount received in 1965 totalled only Rs. 14.0 lakhs casting a loss of Rs. 13.2 lakhs (and perhaps Rs. 18.4 lakhs) on the Equitable Coal Co. Since the proportion of own consumption has gone down from 54 per cent in 1965 to 40 per cent in 1966 and the general costs have risen, the loss in 1966 may be substantially higher. In other words, while the outside companies buying sand from the Equitable Coal Co., get short payments under the coal Board's formula, the Equitable Coal Co. is debited not with the amounts paid by way of subsidy to the outside companies, but with the full amount received by it, which includes its margin of profit. Only the balance of its admitted costs is reimbursed. In fairness, this sand stowing unit should be treated as an outside contractor. However, the question of treating Bhaladih as a contractor to the extent that it does not service Equitable's own collieries has been raised by the firm with the Coal Board and is at present pending a decision. We suggest that the decision should take note of the fact that sand stowing by the Equitable Coal Co. for other firms is not an activity to be treated as part of their own coal raising activity.

7.5.2.1.3. This and other mines which may have well-organised mechanical systems of sand recovery and stowing should not be put to any loss through the operation of sub-ceilings if their total costs are below the ceiling for stowing and can be correctly ascertained. Their doing all the work themselves should not result in less generous treatment than work by contractors. As regards stowing generally it should be possible to devise a formula that will meet all direct costs in full, and indirect costs on a calculated and reasonable basis. Some flexibility between the sub-ceilings would, we suggest, be fair, so long as the total ceiling is not exceeded.

7.5.2.2. *Quantum for adverse conditions.*—Complaints against subsidies for adverse conditions were fewer and not so serious. Many of these, unlike those in relation to sand stowing, relate to inadequacy of the lump sums per tonne granted or the interpretation of an adverse condition. For example, one complaint is that extra pumping costs in a seam exclude pumping costs due to seepage into the seam from the drainage of a higher seam not entitled to subsidy. Such cases may be rare, and we would leave it to the Coal Board to deal with them generously bearing in mind the desirability that extra costs on account of unusual difficulties are met fully. On the whole, subsidies for adverse conditions appear to have been fairly adequate. We make this remark subject to any findings which the Study Team referred to earlier may arrive at on the basis of its more detailed examination. The only grievances are in relation to the routine involved and the delays in payment.

7.6. To conclude we would recommend that in the case of all these subsidies the objective should be to met genuinely and economically incurred costs in full; for, if any part of these fall on other unsubsidised coal, the costs of production will be distorted and resistance built up to mining under adverse circumstances with extra necessary expenditure. This besides being inequitable to the units concerned will only work against the consumers of coal in the long run. For this purpose (a) collieries supplying sand to other collieries under well-organised sand collecting systems should be treated as outside contractors, and (b) a formula should

be devised which will meet all direct costs in full, and all indirect costs which cannot be isolated from the coal raising operations on a fair and equitable basis. Our suggested prices and pricing system are based on the anticipation that this will be done, and that all subsidies will be realistic.



Chapter 8

TRANSPORT OF COAL

8.1. Transport of coal has been the main problem of the coal industry, and one of the over-riding reasons for price and distribution control. Coal represents a third of the total freight originating on the Indian Railways. It is almost all mined in the Bengal-Bihar area, but consumed all over the country. Almost all coking coal is produced in Bengal-Bihar. The problems of transport have been studied in detail by the Coal Transport Study Team of the World Bank (hereinafter referred to as C.T.S.T.), whose main findings may be summarised as follows * :—

- (1) Railways are and will continue to be the chief mode of transport of coal. The quantities which can be moved economically by other modes involve very short or very long hauls, and will not exceed ten per cent of the total volume.
- (2) The needs for transport of coal can be moderately reduced on an economically rational basis by several means :—
 - (a) By substitution of other fuels, notably fuel oil, where in terms of real cost to the economy the delivered cost of substitutes is lower than the delivered cost of coal.
 - (b) By substituting, in appropriate cases, the extra high cost of long distance transmission of electric power for rail movement of coal.
 - (c) By further developing production of coal in certain outlying fields located substantially closer to consuming points than are the Bengal-Bihar fields, (but, after taking account of the fact that

*India Coal Transport Study, Vol. IV (Findings, Conclusions and Recommendations), June 1964 (submitted to Government of India).

transport of by-product coal from the washeries in the Bengal-Bihar area is more economic than mining of new coal in the outlying fields).

- (d) By the intensive use of diesel and electric traction for coal fired steam traction on the railways.
- (3) The tonnage of coal to be moved by rail will increase by approximately 80 per cent, between 1962-63 and 1970-71. This will impose *an enormous burden* on the railways.
- (4) The task of the railways is considerably larger than the coal transport requirements because of volume of other bulk commodities (*viz.*, iron and steel, cement, fertilisers, oil products, and mined ores) which must and can be moved economically by the railways and is growing more rapidly than that of coal.
- (5) The major action required to deal with the coal transport problem is to equip the railways for the handling of a much larger volume of traffic in the most efficient manner at the lowest cost.

8.2. *Locational aspects.*—The main consumers of coal are the railways, the iron and steel industry, the thermal electricity plants and the cement factories.

8.2.1. The Coal Transport Study Team do not foresee any very serious problems in relation to coal for the steel industry till the level of output of that industry exceeds 15 million tons; which would mean that the situation will not become complex for another seven to ten years.

8.2.2. As regards thermal electricity plants they anticipate that the estimated 1970-71 demand for coal will be met by then, though a shortage may arise in Central India. As regards both this area and Rajasthan, such shortage could be met either through local plants using the coal of outlying coalfields, or by power generated at generating

stations located near the washeries with the by-products, and transmitted on High voltage lines. The Study Team's calculations give the important result that where the demand for power is of the order of 750/1000 megawatts operating with a load factor of 0.7 *the costs of KWH of delivered power would closely approximate at all distances with costs of rail transport of the required coal.* In other words, over large areas, with an adequate load "coal by rail" and "coal by wire" would cost the same. It would, therefore, be desirable to reduce the load on rail transport by utilising coal at the pit-heads or washeries, or as near these as possible, for thermal generation where these conditions are satisfied. For instance, a power plant near the Dugda washery linked with a 400 KV transmission line to a terminal point between Jabalpur and Nagpur and feeding into the transmission network of Madhya Pradesh and Maharashtra would obviate the need for moving 4.2 million tons of coal. The Energy Survey Committee has on similar considerations recommended supply of electricity to Rajasthan from the Satpura Thermal Plant.

8.2.2.1. The C.T.S.T. have also gone into the economics of nine power plants in Central India and come to the conclusion that the costs of transporting washery by-products to these stations would be substantially lower than mining coal in the outlying coalfields. This is an important finding from the point of view of the disposal of washery by-products. The Team expect that the demand for coal for power generation in the Southern and Western Regions far from Bengal—Bihar will fall between 1962-63 and 1970-71. The increase of production in the Singareni Coalfields would lead to the same conclusion as regards the southern parts of the country.

8.2.3. In relation to Railways the C.T.S.T. roughly estimate a consumption of 650,000 tons of diesel oil in 1970-71 substituting approximately 6 million tons of coal.

8.3. *Means of Meeting future demand for coal.*—Projecting for the future, the C.T.S.R. have arrived at the following conclusion regarding the best means of supplying their

projected demand of 83 million tons of non-coking coal in 1970-71 :

Source of supply	mill. tons
Bengal-Bihar	55.5 (including 15 m. tons of by-product coal)
Madhya Pradesh and Central India	13.3
Outlying West	5.2
Maharashtra	1.5
Andhra Pradesh	5.2
Orissa (Talchar)	2.1
Assam etc. . . .	0.6
TOTAL	83.4

Since, as against their estimated demand for non-coking coal in 1970-71, the latest estimate is only 70 million tonnes, the above figures of the C.T.S.T. would have to be adjusted in somewhat the same proportion.

8.3.1. Even on the basis of their figure of 83.4 m. tons the C.T.S.T. make the following recommendations :—

- (1) An alteration of the existing price relationships between coal on the one hand and fuel oil and diesel oil on the other, so that they will better reflect their real costs to the economy. This suggestion includes (a) revision of taxes on petroleum products which give an inappropriately high preference to coal, (b) substitution of ceiling prices for fixed prices of coal, and (c) adjustment of rail rates on coal and petroleum to reflect actual differences in cost of transport.
- (2) Supply of by-product coal (through a low cost closed circuit railway operation) to thermal power plants wherever the costs of transport are lower than costs of mining and transporting new coal.

8.3.2. Then, evidently anticipating the ability of the railways to increasingly meet demand for transport of coal, they recommend that,

“As soon as the production of coal below Grade I and the supply of wagons are adequate for the demand the control of coal distribution by the Coal Controller should be limited as follows :

“(a) Prospective users of coking coal and non-coking coal of grades Select A and B and I would continue to make annual applications for allotments. The railways would accept indents for wagons to handle coal of these grades only upon receipt of evidence of the Coal Controller's authorisation. The railways would report the shipment of coal of these grades to the Coal Controller daily. The railways would not be required to maintain elaborate records to check shipments to each coal consumer against individual allotments; and

“(b) There would be no controls of shipments of coal below Grade I except as necessary to avoid cross hauling. This would be accomplished by instructions to railways, the industry and to the State Coal Controllers specifying the coal-fields from which consignees in each area should purchase their coal.”

8.4. We doubt whether transport has really eased to the extent visualised by the C.T.S.T. when they submitted their report in June 1964. For, at the time of our inquiry we found that the pit-head stocks in the country went up on the last day of the financial year from 3.77 million tonnes in 1961/62 to 5.26 million tonnes in 1964/65, and stood at 4.87 million tonnes in 1965/66. Even as regards the Singareni Collieries, their stocks, when we visited the mines on 19th March 1967, were as high as 840,000 tonnes with a large unsatisfied demand in an area where transport should have been easier than in the Bengal-Bihar area. This has at the time we signed this report gone up to 9,12,000 tonnes of which it is reported that 4,34,000 tonnes are covered by unfulfilled orders and awaiting wagon allotment.

Chapter 9

SYSTEM OF PURCHASE AND DISTRIBUTION CONTROL

9.1. *Colliery Control Order* (1945).—An almost complete control over the purchase and distribution of coal is exercised under the Colliery Control Order (1945). Under Section 12A of the Order the Coal Controller or other competent authority is invested with the powers to allot quotas. Section 12E prohibits sale by a colliery or purchase or acquisition by any person without due authority. Section 12B prohibits an allottee from use or disposal of coal allotted to him otherwise than in accordance with the conditions of allotment. The effectiveness of the control is almost entirely due to the fact that rail transport becomes available only against an allotment order from the Coal Controller or other competent authority.

9.1.1. For the purpose of distribution, consumers are grouped under different priority classes ranging from A to P on the basis of their needs and importance, and each class has a sponsoring authority. Thus coal for export has the highest priority—A, and has to be sponsored by the Central Government. Chemical industries (other than heavy chemicals and fertilisers) have a lower priority—K, and have to be sponsored by the State Government concerned. Brick burning coal has a very low priority—O, and has to be sponsored by the State Government concerned, generally through the State Director of Industries.

9.1.2. The allotment takes into consideration the availability of coal of the grade asked for, and of the contemporary state of the railway transport position. Generally only the lowest grade or type of coal which will suit the consumer's requirements is allotted, though it might sometimes happen that there is a temporary surplus of a better coal to be disposed of and therefore it is made available. The transport position, on the other hand, determines the source of allotment, and the Coal Controller selects this in consultation with the railway authorities, so as to avoid cross movements,

long haulages and to secure the best use of available wagons. Thus consumers of lower grade coals in Central and Western India south of Katni-Pench-Kotah are required to obtain their supplies from the Korba, Rewa, Pench or Chanda coalfields, and those in South India from Pench, Chanda, Singareni or Talcher.

9.2. *Nature and working of distribution control during 1959-1966.*—One of the important functions of the Coal Controller is to periodically place allocations from the anticipated production and stocks at the various coalfields at the disposal of the Ministries and Departments of the Central Government, and the State Coal Controller (generally the Directors of Industries) having regard to their demand and to loading targets acceptable to the railways. The sponsoring authorities in their turn allot quotas to individual consumers and intimate their recommendations in this regard to the Coal Controller. At the same time they issue permits to the allottees who submit their schedules of demand to the Coal Controller for the grant or priority sanctions for wagons. To secure an even flow of supplies, the quotas are given on a recurrent monthly basis as far as practicable. These quotas were recommended on a quarterly basis to start with, and later on a half-yearly basis, but since 1st January, 1966 they are on an annual basis.

9.2.1. Nevertheless, we understand from the Coal Controller that there are frequent amendments or suspensions of quotas, changes of destination stations and collieries, and sometimes emergent demands needing supply by special allotment or release from railway loco stocks.

9.2.2. As regards coal for brick burning and soft coke for domestic fuel, the demands and available supplies far outstrip the availability of wagons, and are always in small tonnages. Efforts are, therefore, made to bulk the demands, and to arrange despatches in block rakes. In addition, in the matter of soft coke, the selection of the supplying collieries is not left to the allottees. Orders are distributed by the Coal Controller to a large number of collieries mining lower grades of coal suitable for manufacturing soft coke, and full rakes for transport arranged by the Coal Superintendent, at Dhanbad, an officer of the Coal Controller.

9.2.3. Transport was short of requirements from 1959 to the middle of 1963, though coal was plentiful. Thus, though loading targets could be met by the collieries, it was not practicable to ensure equitable supplies to all consumers due to transport limitations, field capacities, and transshipment bottlenecks. Since June 1961 there has been a consumer-wise-Bulk allotment programme for each coalfield which takes account of the minimum monthly consumption of each consumer. The programme, which is in the shape of a printed chart, lists the requirement of each consumer from each source in a particular month. In recent months the total consumer-wise-bulk allotments have been within the capacity of loading areas, due to the easing of demands.

9.2.4. With the easing of rail transport the Ministry of Mines and Fuel decided to relax the control of distribution of Grade II and III non-coking coal, and also soft coke and Singareni coals with effect from 1-7-1964. Consumers were left free to place their indents directly with collieries with no formalities attached thereto. However, the spurt in demand which resulted soon made some screening necessary, and with effect from 1-5-1965 demands for brick burning coal and soft coke were directed to be sponsored by State Governments, and their minimum requirements met through programmes settled by them in block rakes. This indirect control which was disliked by consumers, was relaxed on 1-5-66 since when sponsorship is necessary but not a consolidated programme.

9.2.5. To describe distribution control in brief, the present position is that monthly allocations are made on an annual programme to each consumer on the basis of his requirements and the type of coal which can be made available, and consumer-wise-bulk allotment programmes are furnished every month in advance to the railways for implementation. Additional allocation are made during the slack season between July and December when the wagon position is easier due to lean loading of general merchandise and food grains.

9.3. *Preference for better coal by long distance users.*— A suggestion has been made by a number of consumers that considering the high costs of transport relative to price of

coal, the high ash content of most coals, and the loss of coal in transit over long distances, preference should be given to distant consumers in the matter of allocation of higher grades. Tata Chemicals, for example, point out that in their case railway freight is 120 to 140 per cent of the pit-head price of coal, and that apart from inflated price per calorie of the coal allocated to them due to transport of the excessive ash in the coal they also have to face technical difficulties in burning lower grade coals. We cannot assess the administrative difficulties but recommend that till unit washeries are set up by the principal mines, better coal should be allocated to long distance users than those nearer to collieries, subject, of course, to the coal being technically suited to the consumer.



Chapter 10

THE PERFORMANCE OF COAL INDUSTRY DURING THE SECOND AND THIRD PLANS

10.1. *Achievements of First and Second Plans.*—No targets were fixed for the coal industry in the First Year Plan. The following table shows the achievements of the First and Second Plans and the targets and performance of the industry at the end of the Third Plan :

TABLE 7
Achievements at the end of each Plan

(in million tonnes)						
Sector	1950/51	End of First Plan 1955-56	End of Second Plan 1960-61	Original target for Third Plan	Revised target for Third Plan	Achieve- ments in 1965-66
PRIVATE						
Coking . .	..	..	12.95	17.82	..	14.18
Non-coking . .	..	..	32.10	44.06	..	39.91
TOTAL .	28.95	34.36	45.05	61.88	57.79	54.09
PUBLIC						
Coking . .	..	..	3.03	12.36	..	2.78
Non-coking . .	..	..	7.59	24.09	..	13.43
TOTAL .	3.87	4.47	10.62	36.45	18.21	16.21
ALL INDIA						
Coking . .	..	13.57	15.98	30.18	..	16.96
Non-coking . .	..	25.26	39.69	68.15	..	53.34
GRAND TOTAL .	32.82	38.83	55.67	98.33	76.00	70.30

10.1.1. As regards the Second Plan, only sector-wise targets were fixed. While the achievement of 45.05 million tonnes by the private sector just exceeded its target, the achievement of 10.62 million tonnes of the public sector

fell short of its target by over 4.00 million tonnes. The figures for the public sector include the production of the Singareni Collieries Company Ltd., (in which there is a trifling private equity interest), which stood at about 2.50 million tonnes.

10.2. *Achievements of Third Plan.*—For the Third Plan, the target initially set at 98.33 million tonnes was found excessive, and was revised to 90 million tonnes at the time of the mid-term appraisal, and later to 76 million tonnes. Production achieved by 1965/66 was 70.30 million tonnes only, though larger capacity existed; but even at this level of production all requirements (save domestic and brick burning) were adequately met. The shortfall was largely due to the development of coal consuming industries not being as rapid as expected, and also to the increasing dieselisation of railways for operational reasons. Meanwhile, on encouragement from the Government, the industry had been geared to reach a much higher target, and amongst the many measures taken to reach it was the import of equipment and stores against a world Bank loan of Rs. 16.67 crores (35 million dollars) at pre-devaluation rate of exchange.

10.2.1. 225 collieries/coal companies participated in the World Bank loan. The loan was for fifteen years, at 5 3/4% per annum interest, repayments covering the period from 1966 to 1976 and was categorised as follows :

Category I	Equipment for new mines . . .	\$5.0 mil. (Rs. 2.4 crores)
Category II	Equipment for expansion of existing mines . . .	\$13.9 mil. (Rs. 6.6 crores)
Category III	Equipment for replacement or maintenance . . .	\$13.3 mil. (Rs. 6.4 crores)
Category IV	Steam operated equipment for maintenance or replacement . . .	\$0.4 mil. (Rs. 0.2 crores)
Category V	Spares for existing and replacement equipment? . . .	\$2.4 mil. (Rs. 1.1 crores)

10.2.2. At a later stage the funds for categories II to V were merged, and of the total amount of Rs. 14.3 crores allotted to them, a sum of Rs. 12.7 crores is said to have been utilised. As regards Category I, six private sector projects for new mines were approved, and a sum of Rs. 1.1 crores utilised out of Rs. 2.4 crores allotted. Final dates for utilisation were extended on various occasions, in consequence of procedural delays and difficulties regarding counterpart funds arising largely over legal difficulties in transferring or mortgaging coal leases. It is not necessary for our inquiry to examine the causes of these delays. What is relevant is that nearly one mine out of every two with a raising capacity of over 1000 tonnes per month benefited from the loan, and a large capacity, which we cannot however estimate, was built up or is in the process of being built up. The sharp fall in demand, which led to progressive lowering of targets, has doubtless embarrassed many mines which invested in expansion, as we were told at the public inquiry. In some cases machinery is said to have arrived but not yet installed for lack of funds and demand.

10.2.3. The sector-wise production in the III Plan was as follows :—

TABLE 8

Production in Private and Public Sectors

(in million tonnes)

Sector	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66
PRIVATE						
<i>Bengal-Bihar</i>						
Coking	12.95	14.08	14.31	14.47	13.76	14.18
Non-coking	24.85	24.82	29.95	30.15	28.93	30.78
<i>Outlying fields</i>	7.25	7.40	7.53	8.03	8.18	9.13
<i>Total Private</i>	45.05	46.30	51.79	52.65	50.87	54.09
PUBLIC	10.67	8.93	12.04	13.68	13.51	16.21
ALL INDIA	55.72	55.23	63.83	66.33	64.38	70.30

10.2.4. In 1963-64 the offtake fell below production, and stocks at pit-heads went upto 5·198 million tonnes of which 44 per cent was in Grade I and above, against similar figures of 3·767 million tonnes for 1961-62 and 4·085 million tonnes for 1962-63. This explains the fall in production in the following year 1964-65. For, the stacking of coal involves blocking of capital, deterioration and loss of coal, double handling, and fracture of coal in the process of stacking and recovery, besides risk of spontaneous combustion.



Chapter 11

FOURTH AND FIFTH PLAN ESTIMATES AND CONSEQUENT PROGRAMMES

11.1. The question of future estimates is one of importance since the economic mining of coal and the judicious investment of capital depends finally on the forecasts which the management of each colliery makes of the demand for its own production. The Energy Survey Committee has remarked "In view of the high cost of investment on energy it will be important to secure that, while keeping abreast and actually developing needs, it does not run far ahead of the realities and actual development in practice*." At present guidelines are laid down for the industry by the Government on the basis of the investigations and planning of the economy by the Planning Commission. However, for the purpose of the present inquiry we have had to arrive at reasonable forecasts on a rough and ready basis since the Fourth Plan is still in a draft form, and any estimate of long term demand can be little better than a well-informed guess. A forecast of industrial growth is difficult at this moment in the absence of any distinct trend over the last five or more years even when the two unusual years 1965-66 and 1966-67 are left out of account.

11.2. *Available estimates on future demand :*

11.2.1. The Energy Survey Committee which went into the issue in detail made the following estimates based on three different assumed rates of industrial growth :—

	(in million tonnes)			
	1960-61	1970-71	1975-76	1980-81
Case I—7% growth . . .	55.1	84.3	124.7	165.9
Case II—8½% growth . . .	55.1	94.9	146.1	205.8
Case III—10% growth . . .	55.1	115.6	176.1	251.6

*Report of the Energy Survey of India Committee, Government of India, 1965, p. 162.

As will be seen the differences are large and depend on the course the economy of the country takes. Consequently, the tasks of the industry will also differ vastly with the rate at which the economy grows. However, we are concerned with the relatively short period of the present and the next Five Year Plan.

11.2.2. The Coal Transport Study Team, working on the same problem in greater detail, and deriving separate estimates for each of the main coal consuming industries, and assuming a rate of dieselisation of railways recommended by them, estimated the demand for coal (coking and non-coking) at 108.4 million tons for 1970/71. Greater faith should perhaps be laid on such an examination of a broken down demand, than on broad considerations of the rate of growth of the economy as a whole. The rate of growth of national income which the C.T.S.T. arrived at, based on past trends is 5.5 per cent, a weighted average of 11 per cent of increase in respect of income from the industrial sector, and of four per cent in the agricultural sector, against the lowest hypothetical figure of seven per cent adopted by the Energy Survey Committee. Even this could turn out to be too high if some of the adversities of the last few years, natural and otherwise, repeat themselves in the immediate future.

11.2.3. The estimates adopted for the Draft Fourth Plan are lower and stand at 106 million tonnes, made of 70 million tonnes of non-coking coal, 33 million tonnes of coking coal and 3 million tonnes of blendable coal for 1970/71. This figure of 106 million tonnes arrived at on an examination of the prospects of each major consumer of coal was broken up further by a Committee of Assessment constituted by the then Ministry of Mines and Metals towards the end of 1966 as follows :

TABLE 9

Field-wise and grade-wise estimated future demand for coal

(In million tonnes)

Field	Grade	1967-68	1968-69	1969-70	1970-71
Bengal-Bihar . . .	Sel.	7.48	7.64	7.71	7.85
	Gr. I	20.11	20.20	20.11	20.66
	Lower	11.09	11.58	11.72	12.91
Central India Coal-fields.	Sel.	0.77	0.78	0.79	0.81
	Gr. I	5.89	5.87	6.40	7.12
	Lower	2.01	2.31	2.29	2.39
Pench	Gr. I	1.00	1.03	1.03	1.03
	Lower	2.34	2.69	2.67	2.65
Maharashtra . . .	Gr. I	0.19	0.18	0.18	0.20
	Lower	1.21	1.47	2.06	2.79
Singrauli	Gr. I	..	..	..	..
	Lower	0.70	1.51	2.85	3.96
Talcher	Gr. I	0.79	1.20	1.34	1.48
	Lower	..	..	..	..
Singareni	Ungraded*	5.03	5.81	6.67	8.37
Assam	Ungraded	0.69	0.74	0.80	0.98
TOTAL (Non-coking).		59.30	63.01	66.62	73.20
TOTAL (Coking)		19.59	20.79	22.96	29.90
Blendable		1.70	2.22	2.40	2.94
ALL INDIA		80.59	86.02	91.98	106.04

*But mostly Grades II & III.

These figures have now been further revised by the Ministry of Steel, Mines and Metals to an even lower total of 99.69 million tonnes for 1970/71, (inclusive of 26.49 million tonnes for coking coal, 3.12 million tonnes of blendable coal and 1.90 million tonnes for export), and 118.77 million tonnes for 1972/73 particularly because of the likely delay in setting up the Bokaro Steel Plant, and slowing down in the plans for expansion of the existing public sector steel plants. The detailed estimates of the Ministry of Mines and Metals are given in Appendix V.

11.2.4. We have not made any independent inquiries since we are hardly in a better position to do so than the bodies referred to earlier, and in any case could not within the short time at our disposal expect to arrive through enquiries of our own at any figures which could claim greater accuracy. However, for the limited purpose of a price structure the broad dimensions are adequate, and these are to be found in the figures last quoted. We, therefore, propose to adopt as the likely demand during 1970/71 a figure of about 95/100 million tonnes, of which roughly 26·5 million would be coking and 3 million blendable. This would include about 1 to 2 million tonnes for export. Of the 70 million tonnes of non-coking coal about 8·50 million would be required in Selected Grade coals and 30·50 million tonnes in Grade I. For 1975/76 we propose to adopt 125 million tonnes, taking into account the views of the Energy Survey Committee and the estimates of the Ministry of Mines and Metals for 1972/73.

11.3. *Past trends in production of high grade non-coking coals.*—The trend of production of the high grade non-coking coals in Bengal-Bihar only is shown below as the figures of the same for the outlying coalfields are of the order of only half to a million tons per year :—

TABLE 10
Production of non-coking coal in Bengal-Bihar area
(By Grades)

(In million tonnes)

Grades	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66
Sel. A . .	5.21	5.01	4.70	4.74	4.53	4.22
Sel. B . .	5.72	4.43	3.54	3.21	2.82	2.83
Grade I . .	9.51	10.19	13.94	15.19	14.98	16.88
TOTAL . .	20.44	19.63	22.18	23.14	22.33	23.93
All Grades . .	27.66	26.84	32.74	33.59	32.03	34.25

The fall in production of Selected Grades is striking and sharp. Even the total production of Grade I and above, though showing an absolute increase, had actually fallen gradually as a percentage of total production of all Grades from 73.6 per cent in 1960-61 to 69.9 per cent in 1965-66. One of the reasons would appear to be the down-grading of seams due to change in methods of sampling and analysis. The following figures furnished by the Coal Controller reveal the change due to down-grading of coal :

TABLE 11
Down-grading and up-grading of coal

	(In '000 tonnes)					
	1962	1963	1964	1965	1966	Total for 5 years
Quantity down- graded . . .	603	2,371	2,728	3,167	3,871	12,740
Quantity up- graded . . .	105	416	501	577	1,111	2,761
Net down- grading . . .	498	1,955	2,227	2,590	2,760	9,979

The down-grading of seams is mainly, we understand a consequence of the characteristic of most seams in India, that the quality deteriorates as workings go deeper. Other reasons as given to us by the J.W.C. are :

- (i) lack of price incentives to produce those grades which are now to be found in deeper seams or under more difficult mining conditions;
- (ii) inadequate provision of sand for stowing; and
- (iii) failure to grant new mining leases in contiguous areas to balance the economies of working units when deposits of these grades have been progressively depleted.

11.3.1. These obstacles to increase the production of high grade coals were brought to the notice of the Government by the J.W.C. in a letter dated 14th July 1965, but we do not know the result. We may, however, observe that two specific production incentives were given on 13-6-1962 and 3-3-1964. However, schemes are now on hand to make additional supplies of sand available for stowing; and the question of price incentives, which has engaged the attention of Government, is one of our terms of reference.

11.4. *Past trends in production of coking coals.*—As regards coking coal also, the trend in production of higher grades in relation to other grades is similar as shown by the following figures :

TABLE 12
Production of coking coal
(By Grades)

Grade	(In million tonnes)					
	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66
A, B & C . . .	2.50	2.31	2.10	2.12	2.01	1.89
D & E . . .	4.14	4.01	3.79	3.37	3.17	4.80
F, G & H. . .	6.83	8.00	7.86	8.45	8.31	7.31
HH . . .	2.75	2.67	3.57	3.57	3.04	2.97
TOTAL	16.22	16.99	17.32	17.51	16.53	16.97

Probably the reasons for the falling trend are the same as in the case of non-coking coal.

11.5. *Capacity of the industry to meet future demand.*—Two broad conclusions would follow. Firstly, considering that the industry was geared to the production of 100 million tonnes for 1965-66, and as many as 225 mines, including six new ones, have secured equipment and spares under the World Bank loan, the production of 100 million tonnes would not on the whole need any special effort. Some incentive in the form of a higher differential for the production of the Selected Grades alone is called for,

11.5.1. However, while the position regarding non-coking coal appears quite secure, it is not so in respect of coking coal. The present planning by the Ministry of Steel, Mines and Metals is as in Appendix V. The production of coking coal has to be increased from the present level of 17 million tonnes to 26.5 million tonnes, or over 50 per cent, by 1970/71; and to 38/40 million tonnes by 1975/76 or a further 50 per cent. The public sector, viz., the National Coal Development Corporation, has under production or development 16 projects for coking coal with an ultimate capacity of 21 million tonnes against which a production of 4 million tonnes is expected to be available by 1970/71. The private sector has a programme of 24 million tonnes of coking coal against which 14.18 million tonnes were already reached by 1965/66. Their share in the additional requirements will be 6.50 million tonnes by 1970/71 and 9.50 million tonnes by 1972/73. There will be a gap of 3 million tonnes by 1972/73, and of perhaps 5 million tonnes by 1975/76.

11.5.2. Our second broad conclusion, therefore, is that while there should be no serious difficulty in reaching the target for coking coal for 1970/71, the position for later years is at present insecure. Of the additional production allotted to the private sector, about two-thirds is expected to come from depillaring with sand stowing, or by caving or quarrying. About a third will be from new mines or by the development of existing mines. Since easily extractable reserves have all been exploited, some 3 million tonnes by 1972/73 and 4 to 6 million tonnes by 1975/76 may have to be won by deep and difficult mining. This will need considerable additional investment, since we understand that almost all of the World Bank loan was invested in non-coking coal.

11.6. *Potential demand.*—Another important aspect of the coal industry should not be overlooked. While all industrial needs are being met today there is a large unestimated demand for soft coke for domestic use, and of slack for brick burning. As against a provision of 6.94 million tonnes in 1967/68, the estimate for 1970/71 is 9.41 million tonnes, and for 1972/73 11.54 million tonnes. The total consumption of fuel in the domestic sector was estimated at 168.34 million tonnes (coal equivalent) in 1962/63, including 20.0 million

tonnes (coal equivalent) of commercial energy. Here it is limitations of transport rather than of the capacity of the industry to raise coal, that keeps demand unsatisfied. For the immediate future, some more of these demands could be met adequately to the extent transport improves. Elsewhere, we recommend that a comprehensive plan is needed to replace the use of cowdung and vegetative fuel for domestic purposes in the interests of agriculture. It is only to the extent of the success of such a plan for the production of soft coke, and distribution of soft coke and slack, that the demands on the coal industry beyond our present estimates of 95/100 Million tonnes for the Fourth Plan and 125 million tonnes for the Fifth Plan can be assessed.

11·7. To sum up, we feel that in broad terms additional production in the private sector of the order of 3 million tonnes of coking coal by 1970/71, and 6 million tonnes by 1975/76, and of 25 million tonnes of coking and non-coking coal in both the public and the private sectors by 1975/76 would have to be encouraged. (These are rough figures and need to be scrutinised and revised if necessary after the Fourth Plan is finalised.) The new capital involved is again difficult of estimation due to price increases since devaluation and progressive import substitution, but at Rs. 50 a tonne it would be of the order of Rs. 125 crores—a figure which may well be on the low side, and we offer with hesitation.

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Chapter 12

DOMESTIC FUEL AND COAL

12.1. The domestic sector, despite the difficulties it presents in the estimation of present consumption and future needs, is the largest consumer of energy at present. In 1953-54 the energy consumed, as estimated by the Energy Survey Committee, represented about 74 per cent of total energy consumed in the country. This figure includes non-commercial fuels like cow-dung, agricultural waste and fire-wood. It is expected that by 1970-71 the use of domestic fuel will represent only 50 per cent of the total energy consumption of the country and by 1980-81 not more than 40 per cent. The fall in percentage is however deceptive since the absolute figures reveal a large increase from 136.5 million tonnes in 1953-54 to 168.4 million tonnes in 1962-63 and probably 270.7 million tonnes in 1980-81 (all of coal equivalent). It is expected that the commercial energy included in this figure, which is mostly in the shape of oil products, will rise from 15.7 million tonnes in 1962-63 to 28 million tonnes in 1970-71 and 66 million tonnes in 1980-81. This would involve a large expenditure of foreign exchange, since it is not at present anticipated that all this oil will be found in the country.

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12.2. Problems arise even in the availability of non-commercial forms of energy, namely, fire-wood, charcoal, agricultural waste and dung-cakes. We may briefly comment on these. It is anticipated that the total area required to meet fire-wood requirements would in the near future be about 62 million acres. In the absence of a vigorous campaign to encourage the growing of timber for fuel over an area of this order, it is clear that there will be an increase in pressure for commercial forms of energy for domestic fuel. The success of a vigorous campaign to grow timber is however, likely to be frustrated by the growing pressure on land from the population and the over-riding needs of food production. Notice therefore has to be taken of the various measures that

have been suggested in the Energy Survey Committee Report to discourage the use of fire-wood particularly in the towns. The continued use of cow-dung in the rural areas is obviously undesirable since it represents a waste of natural manurial resources. In a reply to an interpellation in Parliament on 25-9-1958 it was estimated that the quantity of cattle dung used for fuel annually was 1200 million tonnes of wet dung (equivalent to the wastage of 2.4 million tonnes of nitrogen, 1.8 million tonnes of potassium and 1.2 million tonnes of phosphates). The Energy Survey Committee, however, estimates that only a quarter of this cow-dung is actually used as fuel. It has long been an objective of Indian agricultural experts to secure maximum use of dung as a fertilizer in view of the continuous crisis in food. As to agricultural waste, much of this has to be used for domestic fuel at present, for it will be a long time before small scale manufacturing units could be set up to handle such of these wastes as have no use as fodder or manure. Every thing considered therefore it is necessary to concert long term measures to meet the needs of domestic fuel in a more rational way.

12.3. For the time being, the substitution of non-commercial forms of energy with commercial forms (not involving foreign currency) may have to be restricted to the towns. The use of packed refinery gases is now popular in many cities and towns, and needs to be encouraged though the prospect of expansion of supplies is small. It is clear, therefore, that all possible encouragement should be given to existing policies regarding low temperature carbonising plants and for the production and distribution of soft coke and briquettes of lignite. The exploitation of the inferior grades of coal, colliery slack and washery by-products which are all likely to be in embarrassing surplus in the not too distant future is therefore of the highest urgency.

Chapter 13

DIESELISATION OF RAILWAYS

13.1. The Railway Fuel Economy Inquiry Committee under the Chairmanship of Shri D. C. Driver appointed as early as 1951 "to examine the supply, consumption and reserve stocks of coal on railways and to make recommendations for economy in expenditure on coal used as fuel" reported in 1953 recommending among other things, (a) diesel traction on Saurashtra Section (Gondal Division), (b) diesel light rail car service on suitable sections, and (c) diesel power for shunting service.

13.2. The rapid economic development under the successive Five Year Plans has made high demands on railway transport and placed a heavy burden on railways which were required to carry an increase of freight traffic by 180 per cent and of passenger traffic by 63 per cent between the years 1950-51 to 1965-66. The great increase in traffic was most pronounced in areas where the density of traffic was already high. Thus, the economic growth and the density of traffic were the two main factors which were responsible for the steps taken to provide additional track and/or to change the type of traction. Dieselisation/electrification was introduced on a phased programme on sections where steam traction had already reached its limits. For, additional line capacity could be provided by diesel/electric traction alone. Such a large increase in traffic could not have been handled by the railways but for the farsighted policy of phased programme of dieselisation/electrification initiated early during the First Plan.

13.3. The Expert Committee on Coal Consumption on Railways appointed in 1958 to study the railway coal problems had also recommended rapid electrification and progressive dieselisation of main line services to improve the line capacity where electrification was not feasible. This dieselisation/electrification of railways is bound to affect the demand for coal by the railways.

13.4. The Joint Working Committee of Colliery Associations has opposed dieselisation of railways not on the ground of a fall in demand for coal by railways but for strategic reasons and its effect on the balance of payments and suggested re-examination of the relative merits of diesel and steam traction and reconsideration of the programme for dieselisation.

13.5. As pointed out above, the two reasons for phased programme of dieselisation/electrification have been a great increase in freight traffic and density of traffic as a result of increased tempo of economic development. When the targets for coal production were laid down, the effect of dieselisation/electrification on the demand for coal by railways must have been taken into account; for, it was expected that as dieselisation progressed the demand for coal would fall, while electrification would raise it. The Perspective Planning Division of the Planning Commission has made an assumption that most of the additional traffic generated will be catered for by diesel and electric traction and a large part of the movement will be through heavy-load higher-speed box-wagon trains.

13.6. It is not within our competence or terms of reference to make a comparative study of the merits and demerits of dieselisation. We have no doubt that the policy of dieselisation has been accepted by the Government after a thorough inquiry by experts, and the factors of strategy and balance of payments fully taken into account. It is, therefore, too late in the day to think of a reversion to steam locomotives. In the last analysis, it is the question of balancing the advantages and disadvantages. It may be true that direct transition from steam traction to electric traction without the intervening phase of diesel traction would be preferable; yet, such a direct transition postulates adequate availability of electric power at a cheap rate. Despite the great strides made in electricity generation, it is doubtful whether such a direct transition to electrification would be possible in the present circumstances. Moreover, as about 45 per cent of the goods traffic is now hauled by diesel or electric traction, the reversal of this policy is obviously out of question. With increasing economic development the demands on railways would become greater and greater and can be met only by increased operating

efficiency. Though dieselisation might have an adverse effect on the balance of payments position through higher imports of crude oil, it should be noted that diesel oil requirements for rail traction constitute only 16 per cent of the total demand for diesel oil for all consumers in the country. Moreover, we are informed that we have recently become self-sufficient in our requirements of high speed diesel oil and a small consignment of the same has in fact been exported during March, 1967.

13.7. The steam locomotive, the famed iron horse of earlier days, is being gradually displaced all over the world by diesel or electric locomotive. Compared with the old steam locomotive, diesel has higher speed, can haul larger loads and operate for longer period without being taken off for maintenance. It can, for example, pull a train from Cochin to Pathankot without halt for service. A steam journey would require at least nine steam locomotives on this route. Again, one ton of fuel is required for diesel as against nine tons for steam. Moreover, about 29 to 37 per cent of the total steam locomotives are reported to be overage resulting in delays and higher operating costs. These need to be retired as early as possible in the overall interest of the economy.

13.8. The Varanasi Diesel Locomotive Works in U. P. which was started as an assembling factory has already begun to manufacture components, and indigenous capacity for the manufacture of about 80 per cent of locomotive components in terms of cost has already been built up. Capacity is expected to be developed for the manufacture of 150 diesel locomotives by 1970-71.

13.9. The Chittaranjan Locomotive Factory has also instituted a programme of manufacturing electric locomotives. The production of broad gauge steam locomotives at Chittaranjan is to be scaled down progressively from the current level of 137 to 47 and capacity developed for 150 electric locomotives by 1970-71. The capacity for producing 30 diesel shunters will also be developed at the railway workshops. The programmes for dieselisation and electrification are being viewed together.

13.10. In view of all this, the effect on balance of payments is not likely to be great. Moreover, as electrification progresses, the demand for coal for generation of electricity would also increase. The main problem for the coal industry is transport of coal over long distances cheaply and speedily. This can be better effected by quicker dieselisation/electrification of railways, and not by a reversal of the policy of dieselisation.



Chapter 14

CONSERVATION OF COKING COAL

14.1. As stated in paragraph 5.1, while the reserves of non-coking coal in the country are ample, those of coking coal are considered to be small. There are fears that the reserves of coking coal will in the very near future become inadequate to the needs of the growing steel industry unless new areas are discovered, or steel production techniques improved to lessen the need for coking coal. Roughly 1.25 to 1.45 tonnes of coking coal, of under 17 per cent ash content, is required to produce one tonne of pig-iron or in terms of raw unwashed coal of the average specification mined to-day, about 2.00 to 2.25 tonnes.

14.2. *Estimates of reserves.*—Past estimates of coking coal of under 17 per cent ash content have been as low as 750 million tonnes up to a depth of 609 metres (Gee 1944) and as high as 2100 million tonnes (Krishnan Committee, 1949). The Coal Board's seam by seam evaluation of the Jharia coalfields which contain almost all of our reserves has resulted in the following assessment :

TABLE 13
Reserves of coking coal

सत्यमेव जयते					(In million tonnes)			
Seam IX/X to XVIII					Proved	Indicat- ed	Inferred	Total
Up to 2000 ft.					2,510	2,504	786	5,800
2000—4000 ft.					11	406	1,820	2,237
TOTAL					2,521	2,910	2,606	8,037

The uncertainties arise partly in determining how much of proved coal can be mined since this coal generally occurs in thick seams which are difficult to mine and wastage occurs between strips. Mining methods in the past have been

wasteful, large quantities being left in the pillars and strips between mined seams of coal; and even with present methods, recovery may be as small as 40 per cent. About half of this becomes available for use after washing. If the French system of mining, now being tried experimentally, succeeds the recovery may go up substantially. The Energy Survey Committee estimates that if an average of 50 million tonnes of pig iron were to be produced annually between now and 2000 A.D. the reserves up to 2000 ft. would be almost exhausted by the turn of the century.

14.3. *Implications of conservation.*—Conservation of the available coking coal would have three aspects :

- (i) Reservation of use, to the extent practicable, to purposes for which non-coking coal cannot be substituted;
- (ii) Maximum extraction, subject of course to utmost safety; and
- (iii) Rationalisation of production, viz., extraction of all coals, coking and non-coking, in a planned manner so as to maintain an output which will balance consumer requirements.

14.3.1. However, considerable coking coal is used as fuel today because it has to be produced in excess of immediate requirements to maintain a rate of increase in production which will meet the anticipated needs of the steel industry as they arise in the future. To quote Lord Robens : “There is a remarkable paradox, that it is easiest and cheapest to conserve coal by continuing to mine it. This is because it is not possible to ‘moth-ball’ mining capacity*.”

14.3.2. Meanwhile, of course, many technical improvements and changes of techniques are being adopted and improved upon in the steel industry to reduce the need for coking coal e.g., use of a proportion of blendable coal, and of fuel oil. In Japan (according to newspapers) a recent process in the Fuji Iron & Steel Co. uses a proportion of coke slack and dust produced during mining, screening and washing coal in slurry form, and is said to result in a significant

*“A Fuel Policy for Britain.” A PEP Report, 1965.

saving of coking coal*. Dr. M. N. Dastur estimates that the coke rate in Indian blast furnaces can be reduced from 900 kg. per tonne to 650 kg. through improved techniques†. This is still higher than the American and Canadian usage of 570 kg. (1959) and the low figure of 502 kg. in Japan.

14.4. *The Coal Board and conservation.*—The measures taken by the Coal Board to secure conservation cover all the three aspects. At the time of grant of permission for opening or re-opening of seams under Rule 39(1) of the Coal Mines (Conservation and Safety) Rules, 1954, the Board examines the proposed scheme of working for technical suitability. It stipulates the thickness of the seam to be worked at a time, and fixes the horizon at which it should be worked. This checks losses due to selective mining with an eye to quick profits. In the final operation of de-pillaring, for which also the Board's permission is necessary under the Rules, conditions as to stowing or caving in are laid down to check loss of coal. Between 1954 and 1958, a scheme of pegging down production was adopted to save reserves of prime coking coal. It was dropped with the increase of the demands of the steel plants. The Fuel Economy unit of the Board sponsors experiments for the blending of coals to save prime coking coal. Valuable experimental and pilot plant work has been done at the Central Fuel Research Institute, the Coal Blending and Coke Research Station at Jamshedpur (a Tata organisation), the Durgapur Coke Oven Plant (West Bengal Government) and the National Metallurgical Laboratory, Jamshedpur. Some of the results of these studies have been adopted in the steel industry with good effect.

14.4.1. There are other promising avenues of conservation e.g., the recovery of coking coal now lost in barriers between small mines which could be recovered through amalgamation; the recovery of coal lost because it lies below inhabited areas, particularly bastees of encroachers which should not be allowed to spring up above valuable coal strata; the recovery of coal below railway lines through sand stowing and so forth. All these require investigation.

**Vide*, Economic Weekly, dated 22nd April, 1967.

†“Steel in India” fourth Sir M. Visweswarayya lecture, February, 1961, P. 19.

14.5. *Estimates of availability.*—With such measures the available metallurgical coking coal is expected to be :—

	(in million tonnes)
(1) Mined coking coal : 50% of 5,800 million tonnes	2,900
(2) Washery yield of (1) at 60%	1,740
(3) Addition of blended coal at 15%	435
Total available coking coal upto 2000 ft.	2,175

Consumption in 1970-71 is estimated at 26.5 million tonnes per annum of unwashed coking coal, which is equivalent to 16 million tonnes of washed coking coal. Therefore, whilst there is every need to mine at optimum levels of efficiency, and explore all possible means of economising in the use of coking coal, there is no ground for pessimism since the existing reserves should be adequate for about 75 years. The reserves can be stabilised even longer if Indian coal is blended with imported coking coal which is available abroad in plenty with a 8 to 11 per cent ash content, if and when foreign currency becomes easier or exports of iron and steel can be built up to finance import of some good coking coal. It is well-known that the successful iron and steel industry in Japan is based almost entirely on imported coking coal and iron ore.

14.6. *The 17 per cent ash formula.*—With a view to conserving prime coking coal, two directives have been issued by Government, one relating to the use of blendable coal, and the other to ash content. Thus the Durgapur Steel Plant is expected to use 15 per cent of blendable coal, and the other steel plants 10 per cent. So also steel works have been asked to tolerate coking coal up to 17.0 per cent ash (23.5% in coke), and use coke up to 3/4". The directive regarding ash content has been criticised by a prominent mining engineer, Shri B. H. Engineer, in his presidential address at the annual meeting in 1966 of the Mining Geological and Metallurgical Institute in the following words :

“By using low ash coke, the capacity of the blast furnace can be increased by decreasing the charges of other materials like limestone....And how do

we conserve metallurgical coal by supplying it to the steel works at 17 per cent ash instead of at 15 per cent ash. Their requirement of coal at 17 per cent ash will certainly be more than their requirements at 15 per cent ash. If we recover 5 per cent extra coal by increasing the ash in the clean coal by 1 per cent and if the steel works use about 8 per cent extra coal, if the ash in coal goes up by about 1% then there is no conservation of coking coal. On the other hand, we are losing coal by using more of it. And by using 17 per cent ash coal and increasing the consumption of other raw materials and thus reducing the capacity of blast furnace, we are harming the country's economy."

14.6.1. We have consulted all the Steel Plants on the issues raised by Shri Engineer. Though they did not give categorical views on the issue of conservation of coal, they confirm the cost advantages of using coking coal with lower ash content (say, 1%) as may be seen from the information supplied by them, which is given below :—

TABLE 14

Ash % of coal used, and rates of consumption of coke and fluxes in 1966-67

Steel Plant	Ash % of coal used	Average consumption per tonne of hot metal/pig-iron	
		Coke (in kgs.)	Fluxes (in kgs.)
Bhilai	16.99	792	444
Tata Iron & Steel	17.38*	825**	317
Rourkela	17.75	936	387
Indian Iron & Steel (estimated)	18.86	942	367

*Coal mixed with 80% washed coal.

**Equivalent to 1.32 tonnes of coking coal.

TABLE 15

Estimated effects of a 1% reduction in ash content of coking coal used

Steel Plant	% change in consumption rate of		% change in production of pig-iron
	Coke	Fluxes	
1. Bhilai	-1.6	-5.3	+1½ to 2
2. TISCO	-4.0	-5.0	+3 to 5
3. Rourkela	-7.9	-8.0	+6½
4. IISCO	-4.5	-5.0	+4½

However, there is no unanimity in the degree to which benefits can be derived by using low ash coal. This may be due to the differences in the operating practices in the steel plants, but this requires expert examination.

14.6.2. From the studies of the Central Fuel Research Institute on washing characteristics of coal, however, it would appear that recovery of washed coal is higher if the output is in terms of 17 per cent ash coal than if the aim is to produce 15 per cent ash coal. This increased recovery, which is of the order of 10 per cent, is one reason for the use of 17 per cent ash coal. The coal Washeries Committee also came to the conclusion that if the aim is to produce 15 per cent ash coal the ash in the input should not exceed 25 per cent, while if the washed ash content is to be 17 per cent the input could contain as much as 27 per cent ash. The lowest grade of coking coal sold as such is Grade HH (20-24 per cent ash). The Government directive, therefore, has the effect of eking out our supplies of coking coal up to 24 per cent ash, and using grades even slightly lower in the future. This may be the reason for the Government directive which would have balanced the extra cost of production of iron and steel with the needs for stretching the country's resources of coking coal. We have of course not examined the issues in any depth,

14.7. *Washing of coking coal*.—This leads to the allied topic of the washing of high ash content coking coals more fully dealt with in our chapter on washeries. There we make some comments on the desirability of not washing coking coal of ash content 15 per cent (grade C) and less which can be blended direct with washed coal. Coke/coals of this and higher grades from certain seams, such as, Dishergarh, Sanatoria, Patherdih, Poiniati, Koithree etc. can, according to the Central Fuel Research Institute, be used for blending without washing. Such coals are not washed by the Tata Iron Steel Works, but are washed at the Kargali washery. The practice at the Kargali washery appears to us as of doubtful benefit, since the price of the washed product is double that of the raw input. This is an issue we have not investigated but mentioned in passing for the technical advisers of the Government to examine.

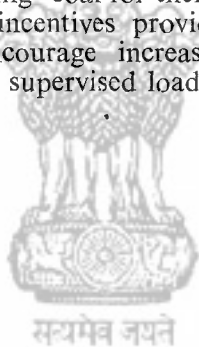
14.8. The possibility of using some Assam coal for blending should also be considered. The coking properties of this coal are said to be good, and the adverse factor of 4 to 8 per cent sulphur could be reduced to permissible limits if suitable proportions of this coal and of Bengal/Bihar coal are adopted.

14.9. It is clear on the whole that action to conserve our limited supplies of coking coal is needed on the following lines :—

- (1) A price inducement for maximum extraction from the seams.
- (2) Subsidies for deep mining.
- (3) Some compensation for restrictions, if and when they are placed deliberately, on the quantity allowed to be extracted by each mine.
- (4) A price which will enforce economy in use and check misuse, and
- (5) Blast furnace efficiency.

14.9.1. Measures of this type for conservation are equally applicable to non-coking coals of the higher grades, and the Coal Board is fully alive to them.

14.10. Coking coal now appears to be underpriced even on the basis of useful heat value, and the many small increases of price since 1959 have eroded some of the differentials, since the increases have generally been uniform. The steel industry which uses washed coal at a price of Rs. 60 per tonne or thereabouts cannot be hurt by a larger differential than at present. Abroad, and particularly in Japan the industry is viable and even thrives, on coking coal prices of Rs. 60 to Rs. 120 per tonne. Whilst all interests including steel have agreed to a higher price than at present and higher differentials between grades of coking coal, no suggestion of the desirable figures has been offered to us. It has, however, been argued that since allotment is made by the Coal Controller, it is not really essential to have price incentives to production, or price dis-incentives to consumption by those who do not need coking coal for their operation. We are of the view that price incentives provided by a more suitable price structure will encourage increased production, careful removal of shale, and supervised loading of wagons.



Chapter 15

FUEL POLICY

15.1. In our terms of reference we have been asked to examine and report on the costs of production of coal taking into account factors which have "a bearing on the future coal production programme". The coal production programme is, however, somewhat vague except for the immediate future. As we have shown earlier in this report, the targets for the Third Plan were repeatedly revised downwards and those for the Fourth Plan are also likely to be smaller than visualised in the draft of the Plan. In view of the uncertainties beyond the current Five Year Plan, we have assumed that for the purpose of our present inquiry we need consider only such factors as will lead to a production of 100 million tonnes of coal (inclusive of 26.5 million tonnes of coking coal) by 1970-71 and of 125 million tonnes (inclusive of 38/40 million tonnes of coking coal by 1975-76). It is obvious, however, that in a planned economy the view point should reach out further than the usual plan period of five years and that the pricing policy and price structure for the current Plan, which our inquiry largely covers, should, if possible, be such as to encourage the industry to prepare itself for the tasks likely to arise for some considerable period beyond 1970-71.

15.2. *Need for fuel policy.*—The pricing of coal even for the immediate future depends to some extent on the place it is given in the energy needs of the country and the directions in which its production and distribution are likely to be encouraged even if not planned in detail. No self-contained formulation of Government policy in the matter of fuel has yet been made and at present we can only find certain broad indications in the draft Fourth Five Year Plan. The Energy Survey Committee was doubtless appointed with the intention of formulating such a policy. In his foreword to the report of that Committee, the then Chairman who had previously been Secretary to the Government of India in the Ministry

of Irrigation and Power remarks, "It was considered that the purpose of the survey would be to take a long term view of the probable demand and to suggest how far resources could be developed sufficiently in advance so as to eliminate any short-fall and to help in planned development". In the terms of reference of the Committee, the Committee was expected to provide the Government of India basic material for development planning in the field of energy upto 1981. The report of the Energy Survey Committee lays down certain valuable guidelines for future policy and also stresses the important fact that in a developing economy and with sources of oil still incompletely investigated such policy will have to be changed with changing circumstances. It is important that steps should be taken to formulate such a policy since no single Ministry is concerned with the matter of energy which is now handled in four different departments, namely, those of Steel, Mines and Metals, of Petroleum & Chemicals, of Irrigation and Power and of Atomic Energy. The Ministry of Industrial Development would also be vitally concerned with the various points arising.

15.3. *Objectives of fuel policy.*—The main objectives as we can deduce from draft Fourth Five Year Plan and other reports would probably be :

- (1) the adequate and continuous supply of fuels of suitable quality at reasonable prices to sustain the growth of the economy;
- (2) the settlement of price levels which would enable fuel consuming industries to keep down costs of production within the country and also to become increasingly competitive with foreign industries;
- (3) the maintenance of the fuel industries in a progressive and viable condition and the concert of measures to continuously reduce costs through increased productivity;
- (4) the regulation of imports of oil at the lowest possible level in view of the foreign exchange required which is likely to be extremely short for a decade or more; and

- (5) the evaluation of social costs involved in the implementation of the earlier objectives.

15.3.1. Should the objectives be broadly as visualised by us above, some conclusions will follow, namely,

- (a) Coal would be the fuel of choice and the use of oil should be allowed or encouraged only when there are such distinct advantages in its use as would outweigh the disadvantage of having to incur expenditure of foreign currency on its purchase;
- (b) Taxation of fuels should be balanced and should not be such as would unduly increase fuel costs or distort the costs of different types of fuel and thereby induce any industry to choose a fuel which is neither the cheapest nor has the best advantages from the point of view of its location merely because of a current advantage in price;
- (c) Energy intensive industries should be encouraged nearer the coal areas, and industries which are not energy intensive at greater distances;
- (d) Due to high capital cost of the energy industries their expansion should not run much ahead of realities as happened with the coal industry during the Third Plan.

15.4. *Competition from fuel oils.*—In the immediate present the only fuel which is likely to compete with coal in this country is fuel oil. In Europe about 40 per cent of all energy is used in the form of electricity or gas, as against less than 6 per cent in India. In India today 52 per cent of commercial energy consumed is in the shape of oil, and 42 per cent in the shape of coal. Very little gas is used in India and the prospects of nuclear energy are for the present uncertain. As regards electricity a substantial increase for industrial power is unlikely until large power stations based on the use of washery by-products and slack coal or nuclear energy and high voltage transmission systems are set up. The Energy Survey Committee does not foresee that the proportion of electricity will be over 15 per cent of all energy even by 1975-76. Assuming, therefore, that coal and oil will

be the only competing fuels, the delivered prices of coal should be sufficiently attractive in relation to oil if the coal resources of the country are to be put to the best advantage. It has been the policy of Government since 1962 to encourage a switchover from coal to furnace oil in cement factories in Western and Southern India particularly those situated far away from the coalfields. Immediately after the World War II there was similar encouragement to the textile mills at Ahmedabad and Bombay, but policy kept changing one way or the other with the availability and price of oil. Again for operational reasons the railways are to progressively change from coal to diesel oil and electric traction. As a consequence the coal demand of the railways will drop from its present level of over 17 million tonnes to 16 million tonnes in 1970-71 and 12 million tonnes by 1975-76 and may disappear altogether by 1990. This follows world trends.

15.4.1. It is desirable that the switchover from coal to oil by industries, and the taxation of oil should be carefully examined and planned since such planning would be of advantage both to the coal using and the coal producing industries. Many industries at present maintain both coal burning and oil burning equipment, with significant waste of capital expenditure, some of it with a high foreign exchange element, due to uncertainties of supplies. A preference for one or the other sometimes arises with changes in current rupee purchase prices and not on the basis of the actual economic cost of the country of the two fuels. How taxation policy could perhaps lead to a wrong choice is illustrated by the following example. There is at present a subsidy on coal moved by sea from Calcutta to the South or West of the country which is sometimes out of balance with the excise duty on oil. Between May, 1961 and October, 1963 a transport subsidy of Rs. 18.53 lakhs was paid by the Coal Board on 61,652 tonnes of coal supplies to Tata Chemicals Ltd., Mithapur, when a slight reduction of excise duty of oil, say Rs. 20 per tonne, on the oil equivalent of 30,000 tonnes would have saved the exchequer Rs. 12 lakhs and given the Company both fuel economy and technical advantages.

15.5. A long term policy on coal will clear up many uncertainties. For the purpose of our present enquiry, we have assumed that the target of coal over the next Five Year

Plan will be of the order of 125 million tonnes as forecast by the Energy Survey Committee, a figure which is supported by detailed estimates made by the Ministry of Steel, Mines and Metals for 1972-73 at 118.77 million tonnes. Should this figure change significantly, which however is not likely, the price structure may need reconsideration.



Chapter 16

FINANCIAL POSITION OF THE INDUSTRY AND ITS DEVELOPMENT

16.1. We have not made any independent enquiry into the financial condition of the industry; our terms of reference do not cover this aspect which is only incidental to the price problem. During our discussions with the industry we have been told, what is also generally known, that the industry has been depressed for the last few years. Large capital investments, including purchase of machinery and equipment by 225 mines (including six new ones) through the World Bank loan of \$35 million (Rs. 16.67 crores before predevaluation) made available in 1965, incurred to meet an anticipated demand, which did not eventually materialise, have left many units of the industry temporarily overcapitalised. The Coal Consumers' Association in its memorandum to the Commission has requested such an inquiry, for other reasons, and stated that the urge for higher prices is really from creditors who are apprehensive of the loss of the principal and interest relating to their investments. It also suggests that creditors through their hold on indebted collieries, try to become distributors, and oppose the amalgamation of collieries as their own financial interests and commission income are affected by amalgamation and the loss of identity of their debtors. Such creditor interests are also said to be opposed to closing down of uneconomic collieries, and dieselisation of railways. We have not made such an investigation since this would have taken us beyond the scope of our enquiry and the time given to us.

16.2. *Trend of profits.*—However, a good idea of the industry in general is available in the Study made by the Reserve Bank in its Bulletin of November, 1966. The study covered 45 coal mining companies accounting for 74% of the capital invested in the industry by public joint stock companies, and 28 private limited companies. The following extracts reveal some salient features :

TABLE 16
Profitability ratios

	1960-61	1961-62	1962-63	1963-64	1964-65
1. GROSS PROFITS AS % OF CAPITAL EMPLOYED :					
(a) Public Ltd. :					
1333 (All Cos.) .	10.2	10.1	10.2	10.6	10.3
45 (Coal Mining) .	8.9	8.3	9.6	8.3	5.7
(b) Private Ltd. :					
501 (All Cos.) .	10.5	11.3	11.5	12.5	12.0
28 (Mining & Quarrying) .	8.2	11.1	11.2	10.0	8.1
2. PROFITS AFTER TAX AS % OF NETWORTH :					
(a) Public Ltd. :					
1333 (All Cos.) .	10.9	10.0	8.6	9.4	9.2
45 (Coal Mining) .	7.8	5.7	8.1	9.0	4.8
(b) Private Ltd. :					
501 (All Cos.) .	12.8	12.6	9.9	9.2	10.5
28 (Mining & Quarrying) .	6.2	8.9	7.8	8.3	7.4
3. DIVIDENDS AS % OF NETWORTH :					
(a) Public Ltd :					
1333 (All Cos.) .	6.6	6.3	5.81	5.8	5.6
45 (Coal Mining) .	5.3	5.1	4.3	4.1	3.6
(b) Private Ltd :					
501 (All Cos.) .	9.4	8.1	7.1	5.4	5.3
28 (Mining and Quarrying) .	8.4	9.2	6.9	4.6	3.6

TABLE 16—*contd.*
Profitability ratios—contd.

	1960-61	1961-62	1962-63	1963-64	1964-65
4. ORDY. DIVIDENDS					
AS % OF ORDY.					
PAID-UP CAPITAL:					
(a) Public Ltd :					
1333 (All Cos.) .	12·0	11·8	10·7	11·1	11·1
45 (Coal Mining) .	9·9	9·6	8·2	8·1	7·1
(b) Private Ltd :					
501 (All Cos.) .	15·4	14·1	12·5	9·9	10·4
28 (Mining and Quarrying) .	10·2	11·3	8·7	6·1	5·0
5. TOTAL DIVIDENDS					
AS % OF TOTAL					
PAID-UP CAPITAL:					
(a) Public Ltd :					
1333 (All Cos.) .	11·2	11·0	10·1	10·4	10·5
45 (Coal Mining) .	9·3	9·0	7·8	7·7	7·0
(b) Private Ltd :					
501 (All Cos.) .	14·9	13·6	12·1	9·7	10·2
28 (Mining and Quarrying) .	10·2	11·2	8·7	6·1	4·9
6. PROFITS RETAINED AS % OF PROFITS AFTER TAX:					
(a) Public Ltd :					
1333 (All Cos.) .	39·6	36·4	33·4	38·5	39·2
45 (Coal Mining) .	31·8	10·3	46·6	54·9	23·8
(b) Private Ltd :					
501 (All Cos.) .	26·5	35·1	28·9	41·8	49·3
28 (Mining and Quarrying) .	—34·9	—2·7	12·3	43·8	50·9

TABLE 17

Index No. of industrial profits (Revised Series)

(Base 1960-61 = 100)

	1961-62	1962-63	1963-64	1964-65
1. <i>Gross Profits including Depreciation :</i>				
(a) Public Ltd. :				
Cos. (All industries)	106.9	117.1	132.4	143.6
Mining & Quarrying	82.5	99.1	85.9	82.8
Coal Mining	99.6	119.5	125.8	106.6
(b) Private Ltd. :				
Cos. (All industries)	116.8	128.6	147.1	156.1
2. <i>Profits before Tax :</i>				
(a) Public Ltd. :				
Cos. (All industries)	105.5	114.8	127.7	132.8
Mining & Quarrying	69.3	87.9	59.8	49.6
Coal Mining	97.8	124.1	118.8	72.5
(b) Private Ltd. :				
Cos. (All industries)	118.4	131.3	151.4	158.7

The figures show that the industry has not fared as well as the industrial sector in general, and that declared dividends of public limited companies have been coming down over the last few years against the general trend in other industries. It is clear from the figures that the industry is not capable at present of any large expansion in production unaided, except to the extent that expansion of capacity has already been secured during the last Plan and remains unexploited.

16.2.1. This expansion was, however, mostly in the non-coking sector since the Third Plan visualised an increase in the private sector from 32.10 million tonnes in 1960-61 to 44.06 million tonnes in 1965-66 of non-coking coal against an increase from 12.95 million tonnes to 17.82 million tonnes

of coking coal. The need for expansion in the two types of coal has been reversed in the current Plan where the increases expected in the private sector are 6 million tonnes for non-coking and 14 million tonnes for the coking coals.

16.3. *Investment required for expansion.*—The investments necessary per tonne of coal, as assessed at 1963-64 prices in the Energy Survey Committee Report*, for the expansion of existing mines and the new mines and for different types of mining are as follows :

TABLE 18
Investment required per tonne of coal (at 1963-64 prices)

	Open cast Rs. per tonne	Shallow under ground Rs. per tonne	Deep under ground Rs. per tonne
Expansion of existing mine	32	46	69
New Mine	40	58	92

This Committee estimated the extent to which in different periods additional coal would have to be produced in the various coalfields by different methods of coal raising. On the basis of this examination, it assumed the following pattern of development in the methods of mining coal during the next twenty years :

TABLE 19
Assumed pattern of methods of mining

	1960-61	1965-66	1970-71	1975-76	1980-81
	(%)	(%)	(%)	(%)	(%)
Open cast	21	22	24.5	27	28
Shallow underground	74	73	66.5	61	58
Deep underground	5	5	9	12	13

*Op. Cit pp. 147-49.

On these assumptions, they set out their estimates of total gross investment in coal mining as follows :

TABLE 20

*Total investment required in coal mining**

(In crores of Rs. at 1963-64 prices)

	1965/6- 1970/1	1970/1- 1975/6	1975/6- 1980/1
(1) To cover expansion			
(a) Mining	270	390	440
(b) Washeries	38	91	95
(2) To replace exhausted mines or worn-out equipment in mines and washeries .	211	296	382
TOTAL	520	777	916

16.3.1. It has not been possible for us to estimate how much of the extra coal will arise from expansion of existing mines, and from new mines, nor how much from open cast, shallow or deep mines. A substantial quantity would, however, have to come from deep mines since it would be in the shape of coking coal of which many shallow mines are approaching exhaustion. The Ministry of Steel, Mines and Metals who have planned for the expansion of coking coal anticipate that two-thirds of this coal will arise from depillar-ing operations with sand stowing, and one third from expansion at lower levels of existing mines. Assuming that the proportions would by and large be as estimated by the Energy Survey Committee the total averages capital per tonne would be about Rs. 49·6 or Rs. 50 roundly, a figure which conforms closely to the actual figure of the current expansion scheme of 2 million tonnes at the Singareni Collieries, nearing completion, which approximates to Rs. 55 per tonne. The figure may go up somewhat due to devaluation and import substitution despite reliefs given in customs duties in the supplementary budget of 1966. The total capital needed for the expansion to 125 million tonnes by the end of 1975-76 would,

(*These figures do not include preparatory action for the following plan period likely to be taken in each preceding plan period).

therefore, be of the order of 125 crores. We do not know what part of this expansion will be allotted to the private sector, but assuming it to be half, the additional capital to be invested by that sector would be of the order of Rs. 12 crores per year. This, from the study of the industry by the Reserve Bank, would clearly be beyond its means.

16.4. Price increases to provide funds for development.—The industry has pleaded for the inclusion of an element in the price which would generate these funds, and urged that the expansion of the industry should not be through loans or a debt which would be a burden on it for all time.

16.4.1. To generate a sum of, say, Rs. 12 crores per year for the development of the private sector through a price increase, subject to taxation, would mean the spread of a sum of Rs. 20 crores over an average of 50 to 60 million tonnes of coal or over Rs. 3 to 4 per tonne. This would be far too heavy an impost on the consumer, particularly because it would be to create capital assets which will be of primary benefit to the shareholders or owner of mining concerns. There is also no certainty that this element in the price will be used for the purpose of development and will not be frittered away in dividends. On the other hand, it is rather unlikely that the smaller units, and particularly private limited companies, will plough in such funds in preference to sharing out this additional profit. Hence the idea of an incentive to development through a price increase would be inappropriate and probably rather ineffective.

16.5. Schemes for financing development.—Other schemes would therefore have to be devised to assist the financing of expansion schemes. These may be through loans, or taxation measures.

16.5.1. The recent Study Group on Coal Prices under the Chairmanship of Shri Ganguli, considered three alternatives :

- (1) Loans from the market through debentures or from banks;

- (2) Loans from Government sponsored financial institutions like the Industrial Development Bank, the Industrial Finance Corporations, the Life Insurance Corporation and the I.C.I.C.I.; and
- (3) Loans from a fund to be created by levying a cess on coal.

As stated by the Study Group a cess at the rate of Re. 1 per tonne on all grades of coal would generate a fund of Rs. 7 crores per year and if supplemented by ploughed-in-profits could meet the extra needs of development. The advantage of the scheme is that the loans would be repaid after some years, and provide a rolling fund for the development of coal as the country's needs advance. In fact since the immediate need is for the increase of production only of coking coal, and capacity for non-coking coal is adequate for the current Plan, even a cess of Re. 0.50 may meet all the Fourth Plan needs.

16.5.2. In the matter of tax incentives, quite a number of suggestions have been made. These briefly are :—

- (1) Generous depletion and depreciation allowances.
- (2) Tax holidays.
- (3) Inclusion of pre-production costs as revenue expenditure.
- (4) Generous development rebates.

It has been pointed out that Canada allows the entire cost of development expenses to be written off in one year as revenue expense against the seven per cent depreciation allowed in this country. So also depreciation on machinery is allowed in Canada at 30 per cent against 15 per cent in India. Again, while tractors and trucks are depreciated in India at the rate of 25 per cent, dumpers with a shorter life are allowed depreciation at the rate of 20 per cent only.

16.5.2.1. Some of these issues were examined by the Taxation Enquiry Commission (1953-54) who have dealt

with these in Chapter VI of Vol. II of their report. The Commission recommended amongst other matters,

- (1) Abortive expenditure on exploration should be allowed as revenue expenditure in the year in which it is incurred.
- (2) Expenditure on successful exploration and on development of mines should be charged against profits.
- (3) Expenditure on tangible assets should be admissible for depreciation, and that incurred on intangible assets amortized.

It did not consider depletion allowances suitable.

16.5.3. We do not consider it is within our province to examine any of these issues. Since we are of the view that none of these should be taken account of in the price structure, save an element to compensate for the increased cost of replacement of depreciated machinery, we do not wish to deal with these issues further. We would however suggest, that considering the high cost of machinery, and the difficulties of operation and maintenance, it is desirable that Government should examine the suggestions made by colliery owners on the issues of depreciation, pre-production costs, taxation of new enterprises and amortisation of pre-production costs.

16.5.4. To complete the picture we may mention that the coal industry is now eligible to a development rebate of 35 per cent on the value of newly acquired machinery, and has also been given concessions in respect of import duties on certain specified items of machinery and equipment.

Chapter 17

THE PRICING OF COAL : POSSIBLE PRICE STRUCTURES, STABILITY OF PRICES AND PRICE REVISIONS

17.1. The Commission has been asked to recommend a suitable price structure for different grades of coal produced in different regions as also the basis on which prices should be revised in future. The issues arising would fall broadly under two heads of a pricing policy on which we have made some observations in Chapter 15, and the system or basis on which the actual prices would be fixed which we now deal with. The examination of the costs of production is the first step in this process. Broadly speaking, the pricing system would involve the settlement of a formula, which could be applied to the cost structures arrived at by examination of the working of the representative collieries to settle prices which would secure the policy objectives. The problem then would be the broad strategy of the use of prices, to secure the production of coal in proper qualities and quantities to conserve coking coal and the higher grades of non-coking coal, and to promote an orderly development of the coal industry to meet the country's long term needs of coal.

17.2. *Functions of a satisfactory price system.*—The functions of a satisfactorily operating system of prices in the field of energy have been laid down in detail by the Energy Survey Committee, and they include the following functions from the points of view of the producer, consumer and the nation :

A—From the point of view of the producer :

- (i) They give the producer of energy the incentive to produce, that form of energy coal, oil, electricity or whatever it may be—in the necessary volume.
- (ii) They give indication to the manager of the individual undertaking as to the volume of output he should attempt to extract from the undertaking.

- (iii) They assure to the efficient undertaking the prospects of regular production which can make possible the minimisation of costs.
- (iv) They put pressure on the manager to minimise these costs and operate with maximum efficiency.
- (v) They indicate which undertakings should continue to operate; which should be expanded; which should be closed down.
- (vi) They encourage the production of higher qualities or grades (of coal for example) and discourage production of lower qualities.
- (vii) They encourage the production of energy in those regions where energy is most needed and discourage it in locations that are less economic.
- (viii) They discourage wasteful production of energy and the exhaustion of nationally valuable resources.
- (ix) They provide to efficient undertakings both in the public and the private sector profits which can be used for the further developments of the industry and for a longer-term policy of exploration, technical research and training.

B—From the point of view of the consumer :

- (x) They encourage him to use the type of energy that best suits his particular needs, having regard to the real cost of supplying the energy.
- (xi) They encourage the consumption of those types of energy which are in surplus supply and discourage the consumption of those types of energy that are in short supply.
- (xii) They encourage the consumer to draw his energy from the source that is nearest to him or from which he can most economically be supplied and discourage the use of sources involving heavy costs of transport, except, so far as a cheaper source of energy makes it economic.

- (xiii) They encourage a consumer to increase his consumption in all circumstances in which the additional value to him of additional consumption exceeds the additional cost of providing that additional energy; they discourage him from demanding additional energy in all circumstances in which the additional real cost of providing it exceeds the additional value of it to him.
- (xiv) They assure to the consumer a sufficient supply of energy of the required quality at the minimum cost at which it can be made available.

C—From the national point of view :

- (xv) They should be such that successful efforts are sufficiently rewarded, without yielding to any group of the community earnings or profits on a scale or of a kind that are repugnant to national policies.

As general guidelines for price policy, these are unimpeachable.

17.3. *Basis for price-fixation :*

17.3.1. *Average cost as basis.*—The coal industry is a mining industry and obviously cannot be compared with a manufacturing industry where the processes of manufacture, the machinery employed and the costs of raw material, labour power and so forth would be comparable, within limits, even if not uniform. It is extremely heterogeneous. Conditions of production (*i.e.* mining difficulties) are different from area to area and could indeed vary in the same mine from level to level, from coal face to coal face, and from time to time. Besides, not only could costs of production be different in different parts of the same colliery at the same time but the market value of the coal mined at the same time might very well differ vastly from one seam to another. Besides, even while mining the same seam, say by the hall and pillar system, the costs in the earlier stages of the exploitation would be high and progressively increase as distances from the haulage point increase and might go up significantly if difficult conditions are encountered. Contrariwise, whilst retreating and extracting coal from pillars, costs might go down, even

17.3.2.1. All this may at first sight seem academic and in to-day's conditions in India this is probably true. However, it is interesting to recapitulate that the (Ridley) Committee on Fuel and Power Resources, which reported in the United Kingdom in 1952 was evenly split on this very issue of marginal prices. The Committee was unanimous that price should not be less than cost, but was divided into two groups of four members each on whether the cost should be average or marginal. The four marginalists based their case on proper criteria for development of the coal industry, and economy on the part of the consumer. The other four members, who wished to continue average costs, did so chiefly because "coal is so important to the economy that it should be sold at the lowest price which is consistent with the National Coal Board's covering its costs". It was estimated that marginal cost based prices would have added a sum of £200 million to the final costs of consumers. Ultimately average costs were adopted.

17.3.2.2. We are of the view that when coal is under almost complete control with a system of allocation by the Coal Controller, marginal cost would be an inappropriate basis for price fixation in India. It would keep high cost producers in production at the expense of a curb over the production of more efficient producers and at extra cost to industrial user of coal, which the Study Report of Indian Statistical Institute estimates at Rs. 58 crores. Besides, what the consumer buys in India is not coal but coal plus transport. Transport, besides being controlled, is expensive, and often costs more than the coal moved by it. Therefore the considerations which economists would urge in favour of marginal cost as basis would disappear with the inability of the consumer to buy what he pleases where he pleases. Besides, with an uncertain if increasing demand for coal by industry, and a large unestimated and unsatisfied demand by the domestic sector, market forces left to themselves might check the development of the economy or cast too high a price on such development, we are, therefore, of the view that basing prices on marginal costs as recommended by the Energy Survey Committee, and the study of the Indian Statistical Institute is impracticable and undesirable in the present circumstances of the economy.

sharply. The profitability of a mine depends on average costs and average returns over the long period of time between development and exhaustion. It would, therefore, be inappropriate to talk in terms of an average cost mine, or average costs for the whole industry. Our cost examinations have confirmed the findings of the C.P.R.C. that many diverse factors like presence of gas and water, depth and nature of seams, need for timbering, and stage of mechanisation also affect costs significantly and sometimes considerably.

17.3.2. Marginal cost as basis.—Both the Energy Survey Committee, and a study of the Indian Statistical Institute* with which we deal in greater detail later in this Report, advocate marginal prices following neo-classical economic theory. Generally costs would be high in those mines which are required to raise coal in the most unfavourable circumstances and of the lowest quality to meet the current demand fully. In an uncontrolled economy, the marginal cost would be the cost of the least efficient mine the production of which is essential to equalise supply and demand. The theory is that this price would in a free economy increase the profitability of more efficient mines and encourage them to increase production and thus bring down prices in the long run. On the other hand, the consumer seeking to buy the qualities and quantities he wants at the lowest or best possible prices will adjust quantity, quality and source of his requirements to secure economy. A marginal mine will, therefore, tend to close down if its costs are too high in relation to the value of its product to the consumer. In a free market, the pattern of production and consumption is brought about through decentralised decisions of individual consumers and individual producers. A price not based on marginal costs, therefore, (in economic theory) encourages the use of coal where other fuels would be more appropriate, shifts demands from poorer but adequate coals to better coals in short supply, gives a price advantage to the consuming industry out of line with the real cost of coal, and thereby distorts the economy.

* "Pricing Policy for Coal Undertaking in India" by P. K. Upadhyaya and Sharwan Kumar, Indian Statistical Institute, (1964), (Revised Draft Report).

17.3.2.3. Moreover, purely theoretical justification for a policy of marginal cost pricing is valid only if it is universally adopted. One of the main objects of marginal cost pricing policy is to ensure that relative prices equal relative marginal costs. This would never be possible in real life. It would, therefore, be wrong to pick up the coal industry alone and apply to it the marginal cost principle.

17.3.3. *Norms on costs as basis.*—The Coal Price Revision Committee based its price structure on what should be regarded as the normal figure for each of the various important items of costs in a colliery facing no problems of special difficulty and managed with reasonable efficiency and economy. The Committee assessed the normal costs under the heads of :

- (i) Wages;
- (ii) Labour amenities and implementation of coal mines regulations;
- (iii) Salaries and expenses of administration;
- (iv) Costs of Stores;
- (v) Cost of power, royalties, cesses etc;
- (vi) Depreciation;
- (vii) Brokerage and commission.

These norms of costs were to apply to collieries which faced no problems of special difficulty and those with difficulties compensated for their costs above the norms with subsidies closely approximating to additional expenditure incurred with efficient management and economy.

17.3.3.1. The scheme settled by the C.P.R.C. was followed or accepted by the Swaminathan Committee, and recently by the Study Group presided by Shri Ganguli. The latter Committee, however, had the limited function of revising the figures of the C.P.R.C. During our discussions with the industry this structure was broadly accepted by all as reasonable and practical. The Energy Survey Committee characterised the C.P.R.C. Report as “admirable work”, though it commented that its recommendations would not

really achieve other important objectives of giving the right relative prices to different grades of coal and the right incentive to expand production where it is in the national interest that it should be expanded.

17.4. Price structure : A suggested alternative scheme.— The study of Indian Statistical Institute mentioned earlier offers also a scheme of price structure for coal. It is the only scheme so far offered by any person or body on a basis different from the existing one for settling prices. This study report after stating that the C.P.R.C. did not follow any rational principles in determining the prices of different grades of coal in each region, offered an alternative scheme. The first chapter of the Report is a critique of the rules on which the C.P.R.C. based its recommendations. It points out several major difficulties and shortcomings and sums up its criticism as follows :

“it involves coal being sold to consumers at rates which may be higher or lower than marginal cost of coal which results in its uneconomical use. The price structure based on a defective system of grading discourages effort towards improving the quality of coal and hinders the best use of those which are of an inferior quality. Due to a faulty system of pricing a huge amount of differential royalty which could have accrued from the coal industry to the State is lost and is transferred to private individuals in the form of unearned incomes”.

17.4.1. The report proposes a pricing policy with the following objectives :

- (1) Equilibrium between demand and supply;
- (2) Recovery of the total costs of production including a reasonable return on employed capital;
- (3) Availability of supply at minimum costs;
- (4) Most economical use of supply; and
- (5) Equitable distribution of unearned incomes.

17.4.2. The main features of the I.S.I. Scheme are as follows : (We may forget for the moment its proposals regarding grading of coal, and treatment of coking coal, which are unexceptionable and have no bearing on the price structure which cannot be applied equally to that of C.P.R.C.).

- (1) Prices be based on the costs of the marginal unit less 10 per cent to set off inefficiency.
- (2) Productive units be grouped in small blocks so that pithead prices could be uniform in the block.
- (3) Allocations be made to consumption areas—proposed as Coterminus with revenue districts—so that costs of transport are the minimum.
- (4) Differentials between grades be based on calorific value.
- (5) Freight rates be adjusted by the railways to calorific value so that costs per B.T.U. are the same for all grades of coal.
- (6) All margins or differences
 - (a) over the extraction price of standard grade coal in the same block;
 - (b) between the standard grade and higher grades;
 - (c) highest unit cost of delivery to a consumption district, and smaller units costs; and
 - (d) between freight rates of standard coal and higher grades

be treated as “economic rent” and appropriated by the State.

17.4.3. The net result, according to this study, will be that coal will become available in all consumption areas at the same price, and with a close link to calorific value. The net result so far as the collieries are concerned would be that each of them would be recompensed on the basis of costs of extraction, including depreciation and interest on working capital, plus a small profit. In short, the scheme would mean that collieries would become more or less raising contractors and any benefit arising out of the advantages of location or

the quality of the coal would be treated as "economic rent" which is not the consequence of any special investment or managerial skill, and would, therefore, be appropriated by the State for the common good. All collieries will get on the average the same margin of profit no matter what grade of coal they produce or what investment they have made or what risks they have incurred. Prices of coal are expected to go up on an average by 20 per cent, and the economic rent appropriated by the State is expected to be of the order of Rs. 58 crores.

17.4.4. Two difficulties or objections arise straight-away :

- (1) The scheme is by and large a measure which is arguably nationalisation of the proprietary rights of collieries in their coal.
- (2) The economics of many mines producing good coal, or efficiently mining it, may be seriously upset since they will lose the premia they now get and on which their stability is founded and investment justified.

17.4.5. The scheme is also based on a number of assumptions which seem to us to be of doubtful validity.

- (1) It assumes that costs of production will be uniform within a block, with reasonable efficiency in mining.
- (2) It assumes that adequate railway transport will generally be available by the shortest possible route between the production and consumption areas linked with each other.
- (3) It assumes that the costs of production in the same mine will remain relatively constant over a fair period.
- (4) It assumes that it is practicable to adjust railway freights for the various grades of coal to the calorific values instead of being based uniformly on weight and distance.
- (5) It assumes that total production in a block and total demand in a consumption district will be relatively constant over reasonable period of time.

17.4.6. We have given the scheme very careful consideration but are not convinced that it is an improvement over that settled by the C.P.R.C. Apart from the legal objections it will put up prices inordinately, and levy a high tax on consumers to the benefit of the exchequer. This may be considered a measure of nationalisation, which is beyond our terms of reference, but even as a price fixing measure, it is, in our view, in no way better than the existing one.

17.5. *Proposea price-structure.*—We have finally come to the view that the price structure for coal under present conditions in the country cannot well be based either on average or on marginal costs, and that the basis adopted by the C.P.R.C. still continues to be, by and large, sound. Unfortunately, however, every increase in cost however small is fully compensated by that structure and does not induce or encourage the progressive reduction of costs with improvement in operational efficiency. It is true that the fixing of norms for each item of expenditure in the breakdown of costs and settling of allowances for development and profit, all involve the use of assessment and judgement, and arrival at broad decisions, but this is inevitable and with care could be fair to producer and consumer alike.

17.5.1. Our cost examination has shown a trend of costs with good correlation between the O.M.S. and costs of production. We have after some thought come to the view that the broken down costs of the units whose O.M.S. is around the national average of private sector units, with some adjustments would be fair to adopt as norms for the price structure. We have thus adopted a refinement of the broad approach of the C.P.R.C. in our recommendations of a price structure and prices. This will be clearer from our Chapters on prices later in this Report.

17.5.2. A price based on such norms would of course be below marginal costs, but this would be an advantage since such a price should in the long run bring about both efficiency and economy by leading to the closure of uneconomic mines, the amalgamation of small units, and the encouragement of low cost producers. It is assumed, as appears to be by and large correct, that the Coal Controller

is in a position to prevent units which are not viable from maintaining profitability through unhealthy practices, selective extraction, or slaughter mining on any significant scale.

17.6. *Need for stability and timing of price-revisions.*—Some other important considerations are necessary in settling an administered price system. Pricing should be in keeping with long term trends of costs, and relatively stable over a long period. The C.P.R.C. had recommended stability over period of five years, and visualised major variations only so far as they were necessitated by wage rises. As noticed by us elsewhere, there have been as many as 38 price increases between 1955 and to-day, including four which were not on account of emoluments and/or benefits to labour. Such instability in prices disturbs the budgets of consuming industries, and in some cases may lead to instability in the prices of their products. It also periodically gives a fresh lease of life to inefficient units, and to the extent that they are able to sell their product merely because of allocation by the Coal Controller to a consumer, who has no choice in the matter, reduces the scope for more efficient or low cost units to expand.

17.6.1. For all these reasons we consider that prices should not be changed for a period of at least two years at a time, and that these instead of being *ad hoc* should be based on a quick cost examination of a few units before the end of this period. We would have preferred an even longer period of, say, five years, but the country is passing through a phase when the wholesale price index increases every month, and the cost of living index of the labouring classes has even less stability.

17.6.2. The best time to introduce any price change would be sometime after the passing of the budget of the Government of India, so as to allow for fiscal measures which might affect the producing or the consuming industries.

Chapter 18

GRADING AND SPECIFICATIONS OF COAL

18.1. *Present position.*—Coal is at present graded on the basis of ash in the case of low moisture coals and on the basis of ash and moisture in the case of high moisture coal. The authority responsible for coal grading is the Coal Board which has staff in every major coal-field to take samples either from the coal seam or from wagons whilst they are being loaded. The initial grading of coal is done on the basis of seam samples but final grading and regrading, when necessary, are done on the basis of surprise wagon samples taken periodically after loading of a consignment is complete and before despatch. Seams are regraded whenever repeated results of wagon samples of coal from a seam reveal a need for a change of the grade allotted previously.

18.1.1. Assam and Singareni coals are not graded. In the case of Assam this is because large quantities are produced on a cottage basis and consumed within the State. Most Assam coal goes to the railways and to the tea gardens who evidently do not require it to be graded. The collieries also get no advantage through grading since the price for their coal is based on an average of the total cost of all the production. In the case of Singareni coals, barring the mines newly opened in 1966-67 in the Ramakrishnapur area, the coal is either grade II or Grade III. The Singareni Collieries at present are equipped with central screening plants which screen the raisings of a number of mines by size only, and would need major changes in their conveyor systems at high capital costs, if the grades are to be separated by keeping the output of the seams of each mine separate. Since the price of Singareni coal is fixed on the basis of average costs of the entire production, any arrangements for grading and separate pricing of grades II and III will only mean that some of the coal placed in grade II will be priced a little higher and the rest in grade III a little lower than the average, with a small addition to the prices representing the extra cost of grading for qualities. Consumers of Singareni coal do not appear

to be particular about the separation of these two grades. Therefore, no purpose would be served by forcing the collieries to instal separate screening systems in place of the present central ones until there is such a demand. This, however, would not apply to the coal that has just been exposed in the Ramakrishnapur area, which is said to be grade I, and would be of value to the cement industry which requires coal of this grade with a low ash content. The full exploitation of this coal is of some importance since it would reduce the fuel costs of the cement factories of South India which now get their supplies from Bengal/Bihar.

18.2. *Complaints on grading and sampling.*—Though the system of grading has been prevalent from 1926, when it was first introduced by the Coal Grading Board for the purpose of standardising coal for export, there has been considerable criticism of the basis of grading and of the methods of sampling only in recent years.

Complaints are made both by the coal industry and by consuming industries but a meeting point has been difficult because the industry has insisted on sampling at the point of loading, where its responsibility for the coal ceases (controlled prices being f.o.r.), whilst consumers would prefer sampling at the point of delivery. Some of the disputes regarding grading appear to arise because loading is done in open wagons mostly by contract labour which is not amenable to adequate control and which, when loading time is short, is prone to fill the wagons from the nearest heap available without regard for the results of admixture. Exchange or mix up of coal might also occur when there is transshipment of coal, from broad to metre gauge. Deliberate malpractice by some suppliers or contractors at loading points cannot also be ruled out. It is however necessary to keep the question of grading and sampling separate since one is the matter of a yard-stick for settling the quality of the coal and its price, whilst the other covers the question of the manner in which this quality should be evaluated in the case of a particular consignment. Some of the consumers' preference for the evaluation on the basis of the heat value of the coal mixes up the issues and assumes that it will follow that the price will be paid on the basis of the calorific value determined

at destination of each consignment. The issues have to be kept separate since at present it is not possible administratively to evaluate each of the 6000/7000 wagons loaded daily.

18.3. Experts' Committee on Sampling and Grading.—In 1962, an Expert Committee was appointed by the Government of India to examine and report on the procedure for sampling and grading of coal. The Committee came to the conclusion that the grading of coal on an ash or ash plus moisture basis has the following draw-backs.

- (1) Calorific value or the heat value, which is what the consumer pays for, is not given enough consideration;
- (2) The effects of moisture and ash are treated as though they are of equal detriment, which is not true; and
- (3) In addition moisture varies from time to time with humidity and temperature and the degree and length of exposure after mining.

The Committee came to the conclusion that the existing method of sampling from a loaded wagon was completely unsatisfactory and the coal should be sampled in motion so that no bias of any nature enters into the taking of the samples.

18.4. Sampling.—We shall deal with sampling first. The Experts Committee recommended that all coals whether coking or non-coking should be graded on the basis of the calorific value and the current sampling procedure should be changed. Broadly the procedure at present is to grade a seam by taking samples along vertical strips right across the seam at four places, and to grade consignments by samples taken by surprise from four places on a loaded wagon. Coal being a heterogeneous material the Committee has proposed a system of sampling in motion which preserves the element of surprise, and eliminates human bias in the selection of samples. The Indian Standards Institution has prepared a standard specification for sampling of coal (I.S. 436-1964). The Indian Standards Institution also have a standard specification for proximate analysis of coal for 9—9 T.C. Bom/67

determination of ash, moisture, sulphur and calorific value, but proposals for amendment are under consideration. It is also actively considering a classification of coal by type using the three parameters of calorific value, volatile matter content, and gray-king coke types. The recommendations of the Experts Committee have been accepted by the Government in principle but presumably have not been implemented partly because of the lack of necessary test facilities and staff and partly because of a lack of agreement on the manner in which joint sampling should be done whether at loading point or destination. The issue is of particular importance to the steel industry since coking coal has nine grades with a difference of just one per cent ash content between grade and grade. When a production incentive for higher grades of coal was given in the price revision of 13-6-62, a fortnight's time was allowed before the revised prices were brought into force for the purpose of facilitating an agreement between suppliers and consumers on the sampling question. However, no agreement was arrived at. When prices were again increased on 3-3-1964 provision was made for an extra bonus over the controlled price provided sampling at destination was agreed to. However, this incentive also proved unfruitful. The collieries were not satisfied with the method of testing at the destination where a large number of wagons, sometimes arriving in a rush, have to be unloaded and separately sampled in the course of delivery from the wagons through a conveyor belt to bunkers or stockpiles.

18.4.1. The Joint Working Committee rests its insistence on sampling at loading points on the argument that controlled prices are f.o.r. and that the collieries' responsibility ceases when the wagons are taken over by the Railways. It also points out that the Railways who are large purchasers, sample at loading points in respect of the coal bought by them, and that the Minerals and Metals Trading Corporation does the same in respect of iron ore and manganese. To the point made by the steel plants that sampling at destination would involve joint sampling at only a few points for over a hundred collieries which supply coal to just half-a-dozen steel plants, the Joint Working Committee counter with the argument that whilst this may be so, every colliery would have to appoint a representative at each and every steel plant and

this would mean hundreds of representatives against the few necessary if the sampling is at loading point. From all discussions we get the impression that the real difficulty is that neither party is confident that sampling away from its place of business will be dependable or free of malpractice by subordinate staff and that the differences of view are not merely on account of sampling methods or overall convenience.

18.4.2. We have discussed the matter with the Coal Controller and his officers who favour the present system both because sampling by the Coal Board preserves the essential element of sampling by surprise and because sampling at destination raises practical difficulties inherent in the short time in which the large number of wagons from various collieries have to be sampled at the tipping points. The Coal Controller has also pointed out that many of the disputes arise for two reasons, (1) variations in quality which exist in the same seam because of the heterogeneous nature of Indian coal and (2) differences in the methods of sampling and analysis. He has given us figures to show that the same coal tested at different plants has almost invariably given different results as will be seen from Table 21.

18.4.3. So also a comparison of the results obtained in samples of the same coal taken by the Coal Board and by various consumers have shown differences sometimes in favour of the consumer and sometimes in favour of the producer as will be seen from Table 22.

These differences may have arisen for a number of reasons on which we would not like to speculate.

18.4.4. The results show that though there could not have been any bias with the collieries for or against any particular consumer, the coal received by the Bhojudih washery was invariably much worse than the grades fixed by the Coal Controller, and that by the Rourkela Steel plant invariably better. It is apparent therefore that methods of sampling and analysis are not the same at these two places.

TABLE 21
Average excess per cent of ash in coal received by steel plants/washeries over
the maximum possible ash per cent in the prescribed grades

	1964			1965			1966		
	April- Dec.	Jan.- Mar.	April- June	July- Sept.	Oct.- Dec.	Jan.- Mar.	April- June	July- Sept.	Oct.- Dec.
1	2	3	4	5	6	7	8	9	10
D.S.P.	2.5	2.9	1.7	1.6	1.3	2.4	1.6	2.5	1.5
D.C.O.P.	1.6	1.6	0.5	0.8	0.2	0.6	1.0	2.3	1.9
IISCO Burnpur	2.3	1.5	1.1	1.1	1.1	0.7	1.0	1.1	0.6
Rourkela	..	..	-3.5	-3.0	-0.9	-2.0	0.1	-1.3	-0.9
Bhilai	3.2	1.2	..	-0.9	-0.9	-1.0	-1.3	-0.6	..
Bhojudih Washery	3.8	3.3	2.4	2.5	3.3	3.8	3.6	3.2	3.1
Dugda Washery	2.0	1.5	1.8	2.1	2.3	2.7	1.8	1.9	2.1
Patherdih Washery	..	..	1.9	3.7	4.0	3.6	4.6	3.4	3.2

TABLE 22

*Variations in ash per cent in the same coal supplied to different steel plants/washeries**

N. B. : Excess of percentage ash over the maximum permissible ash per cent as per prescribed grade has been indicated)

	1	2	3	4	5	6	7	8	9
		Jan.- Mar. '65	Apr.- June '65	July- Sept. '65	Oct.- Dec. '65	Jan.- Mar. '66	Apr.- June '66	July- Sept. '66	Oct.- Dec. '66
<i>ah 'E'</i>									
dih	.	+3.3	+3.3	+4.6	+5.2	+4.3	+4.2	+4.2	+3.3
P.	.	+0.7	+1.3	+1.4	+2.1	+0.9	..	+1.9	+3.9
.	+0.2	-0.8	+0.7	+0.3	+1.0	..
.	+3.2	..	+0.9	..
<i>ee 'D'</i>									
hojudih	.	..	+4.0	+3.5	+3.4	+3.9	+4.5	+3.7	+4.2
hilai	+0.8	+1.7	+0.2	+2.1	+1.6	..
C.O.P.	.	..	+0.2	..	+3.4	+2.4	-0.8	..	..
ourkela	-0.7	+0.3	..	..	..
hugda	+3.3	+2.7	..	..

TABLE 22—*contd.*

	1	2	3	4	5	6	7	8	9
		Jan.- Mar. '65	Apr.- June '65	July- Sept. '65	Oct.- Dec. '65	Jan.- Mar. '66	Apr.- June '66	July- Sept. '66	Oct.- Dec. '66
<i>e 'E'</i>									
iojudih	.	.	+2.6	+2.7	+3.9	+3.1	+2.9	+2.0	+2.9
ilai	-0.2	+0.0	-1.3	-0.9	-0.8	..
C.O.P.	.	.	-0.6	..	+1.8	+1.6	-0.5	..	..
ugda	+1.2	+0.9	..	..
<i>f 'A'</i>									
C.O.P.	.	.	+1.9	-2.3	-2.1	+0.5	+2.3	+2.7	+3.6
SCO	.	.	+2.6	..	..	..	+1.0	+1.1	..
S.P.	+2.7	+3.2	+2.0	+2.8	+4.7
<i>f 'B'</i>									
SCO	.	.	+3.7	..	..	..	+1.8	+2.9	..
S.P.	+7.7	+4.4	+6.5	+1.3	+1.6	+2.5
C.O.P.	-3.8	-3.0	+0.4	+2.2	+3.1	+1.8

18.4.5. Two Officers of the Indian Standards Institution who visited the Durgapur Steel Plant and the coal washeries have reported that they found that endeavours were being made to follow the scientific method of sampling as prescribed in IS : 436. For example, the samples were being drawn from a moving mass, namely from the moving conveyor belts or from the hoppers at the time of unloading of the wagons on the tipplers, and a systematic procedure for taking increments at regular intervals was attempted. The procedure for the preservation of samples and the method of reduction from gross sample to the laboratory sample were also found to conform more or less, to IS : 436.

18.4.5.1. Two points, however, were specifically mentioned by the Indian Standards Institution Officers. Firstly, the coverage of a minimum of 25% of the wagons as provided for in IS : 436 was being done on an overall basis for a period of fortnight/month rather than on a daily receipt basis. Secondly, for lots weighing less than 500 tonnes, only one gross sample was being taken instead of two as prescribed in the standard specifications.

18.4.5.2. As regards the first point, they observed, that the procedure followed would have been alright if the variation observed (in) the receipts of coal from a source during the period under consideration had not been significantly large. If, however, the variation is large, it would be advisable to sample the coal at more frequent intervals. As regards the second point it was felt that any deviation from the requirement of the standard specification was not desirable.

18.4.5.3. The Chairman of the Study Group (*i.e.* the Coal Controller) constituted to evolve a procedure for joint sampling has observed that the matter of evolving a procedure for joint sampling at destination has been much delayed and consequently the long term contracts between the Steel Plants/Washerries and the coal producers remain unsettled. He added that enough of statistical exercises on the variations of analysis results have, perhaps, already been made on the basis of which a formula can be evolved by way of a practical interim measure to give effect to the scheme of joint sampling at the destination end.

18.4.6. In these circumstances we are of the view that with a view to guaranteeing quality, the I.S.I. standards for joint sampling should be enforced as soon as practicable. Till this is done, a greater check on quality should be secured by more frequent tests by the Coal Controller, whose staff should be strengthened for the purpose. Whenever the quality loaded by a colliery from any seam goes up or down consistently it should be re-graded speedily. This will ensure better preparation of coal and better supervision at the time of loading.

18.4.7. A permanent and satisfactory solution of the sampling problem is, however, to provide for sampling with mechanical samplers, which will facilitate sampling in motion and ensure both the element of surprise and the collection of an adequate number of sub-samples to make up the total sample. For this purpose equipment and man power is necessary. Necessary investigations should be made and arrangements set up for such sampling either at despatch or delivery point as the investigation may show to be the most convenient. Till then the arrangements we suggest in para 18-4-6 would be necessary.

18.5. *Grading.*—Next as to grading, commercial grading is needed because of the differing properties of coal types and consequently of their different values to the consuming industry. As regards non-coking coal it is almost all used to generate heat and the heat value is of paramount importance. Such coal is generally graded in other countries on a heat value basis. The National Coal Board in the United Kingdom prices coal on a formula linked with the heat content with certain penalties for moisture, ash and sulphur, which discount not only the loss of energy but also in the case of ash and sulphur compensate for the harmful effects of these impurities. Coking coal is valued partly for its heat content and partly for its properties of carbonisation in steel industry. Coking coal may be coking, semi-coking or weakly coking and its use or utility would depend upon this property. The National Coal Board of the United Kingdom has a complicated formula for putting a value of coking characteristics. We have discussed the issue with Dr. Lahiri, the Director of the Central Fuel Research Institute who is of the view that

in India the heat value also largely determines the usefulness of the coking coal and that if coking coal is given a different price structure from non-coking coal, no special varying element need be attached to coking characteristics in the coking coal grades.

18.5.1. From the report of the Experts Committee and our discussion with the Director of the Central Fuel Research Institute it appears to us that in the case of non-coking coal what is important is not so much the calorific value as the useful heat value. The useful heat value can be derived from the calorific value by a deduction for adulteration of moisture at its par (in terms of weight) and for ash at a discount (at more than its terms in weight). The point is that though calorific value is the most scientific system of grading for combustion properties, the nuisance value of ash, which is more than a mere inert, would have to be taken into account. Failing this there might still be a preference on the part of those who can use high ash coal to go in for low ash types. The Director of the Central Fuel Research Institute estimates the nuisance factor at 1.1 times the ash content in a thermal power station of 37% efficiency using pulverised coal and at 2.5 times in a locomotive of 5 per cent efficiency. As a compromise between these figures he suggests that ash be penalised at 1.5 per cent its weight. This suggestion is supported by the Central Water & Power Commission also. This penalty appears to us to be fair even if rough and ready. The penalty for ash in the United Kingdom where ash content of coal is generally much smaller is round about 1.5 times the ash content.

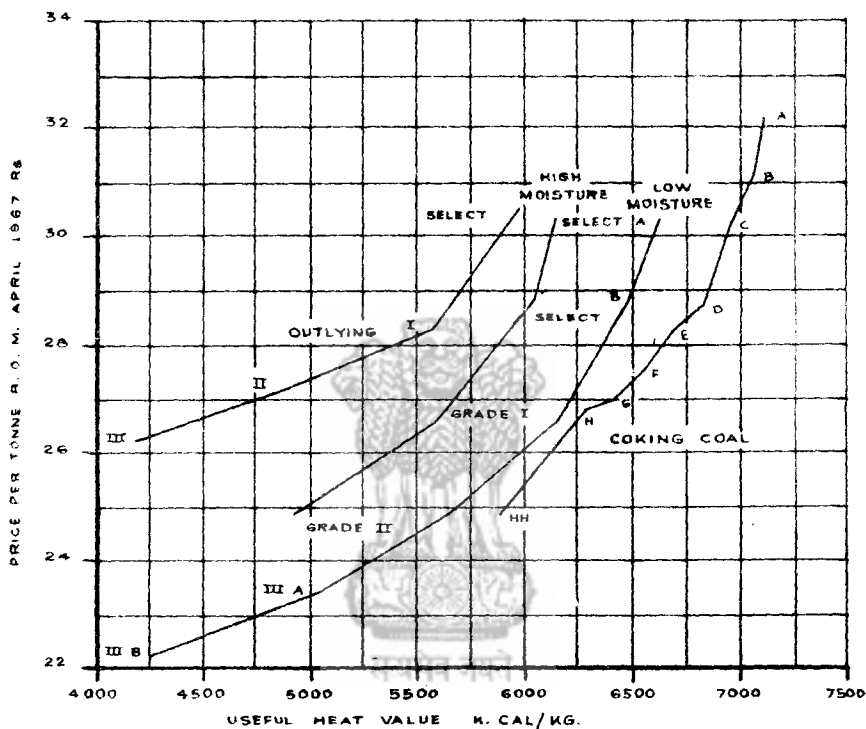
18.5.2. Next we come to the issue of an allowance for the location of the colliery. The prices of coal on the basis of heat value without reference to the location of its source would overlook certain historical, locational and economic reasons which have influenced the prices of the coal in the past. Purely on the basis of heat value, for example, the pit-head prices of coals of Singareni Collieries are overvalued and the same may be true of the Assam coals as well. The cost of coal to the consumer is, however, made up of the costs of recovery at the coal face plus transport charges to the point of delivery. Economically there would be no justification in differentiating the transport cost element whic

represents the cost of transport from the coal face to the pit-head from the further cost of transport from the pit-head to the point of consumption. Even in the United Kingdom where all the mines are State-owned, the basic price of coal is settled on the calorific value plus actual delivery costs but an addition is made depending on the location of the collieries which has no relationship to the intrinsic energy value of the coal. The price structures which now obtain in this country for coal give advantages to some areas which are in the nature of economic rent and could only be got rid of, if at all possible or desirable, under a scheme of nationalisation. To overlook historical price differences will seriously upset the economics of many mines. The Expert Committee has worked out certain formulae by which the value of coal is determined on the basis of heat value with discounts for ash and moisture with an addition of a factor representing historical value.

18.5.3. During the public enquiry we raised the question of how will the empirical formulae suggested by the Expert Committee on grading would compare with calorific value as actually determined with the bomb calorimeter. We have seen the results of 365 samples whose calorific values have been determined both in the laboratories of the Central Fuel Research Institute and worked out with the formulae. The comparison has been remarkably close and with a variation of less than one per cent. We have obtained the useful heat value of typical samples of the existing grades from the Central Fuel Research Institute. The useful heat units of the various grades are shown in Appendix VI. (Also see Graph on next page). We have discussed the matter very fully with the Director of Central Fuel Research Institute and we are satisfied that the fixation of prices of existing grades on the basis of these figures is scientific, practical and desirable. We have therefore decided to adopt these in our price recommendation.

18.5.3.1. The figures show that coking coal has been consistently undervalued over the last fifteen years, and the lowest grades of both coking and non-coking coals somewhat overvalued. To some extent the market and the collieries have reacted to the situation realistically with the large

GRAPH SHOWING RELATIONSHIP BETWEEN
USEFUL HEAT VALUES OF PRESENT GRADES OF COAL
AND THEIR PRESENT PRICES



discounts at which not only the coals with ceiling prices viz., Grades II and IIIA and IIIB of Bengal-Bihar, but even Grade I, which has a fixed price, have been sold over the last few years. In the case of coals with the ceiling prices this has been well-reflected in the prices offered to the Railway Board's invitations for tender. In our view these sales have not been distress sales. As regards Grade I coals these discounts have been given in circumvention of the law by the payment of so called "loading and supervision charges" to buyers. These "charges" have been much higher than needed to cover any legitimate supervision costs.

18.5.3.2. The valuation of coal on its useful heat bas is and the fixation of prices in accordance with this measure of value, however, will have the short term effect of giving a larger margin of profit to coking coals, and considerably reducing the margin and perhaps even removing it altogether in the case of the very inferior coals, whose cost of production is not of a much lower order. We do not think there could be any justification in giving coking coal producers a much higher extra margin than at present, though some increase will be in the long term interests of the industry and the consumer since coking coal has to be own increasingly from greater depths and in more difficult mining conditions. We deal with this more fully in Chapter 21 on the price structure recommended by us.

18.6. *Future Grades.*—For the future we consider that the grades should be in slabs of useful heat value arrived at on a convenient basis. This would be best done in the case of Bengal-Bihar non-coking coals by having slabs of 300 K. Cal per kg. which would retain the number of grades at six. In the case of the outlying coal-fields the slabs could be 500 K. Cal, since this coal is inferior compared to that of Bengal-Bihar, and would result in four grades as at present.

18.6.1. As regards coking coals the present gradation with differences of one per cent of ash content between grade and grade is unrealistic. Laboratory tests could of course be accurate within half a percentage, but in a heterogeneous material like coal the variations in the same seam would need a tolerance of at least ± 1.0 per cent. Only this range of tolerance would avoid frequent regrading of seams. The grades A to G could therefore well be reduced to three, grades A, B and C, grades D and E, grades F and G being combined, with ash percentages of under 13 and up to and including 15, over 15 up to and including 17 and over 17 up to and including 19 or in terms of useful heat values, slabs of 300 K. Cal per kg. The next two grades could be of ash percentage over 19 up to and including 21 and over 21 and upto and including 24%.

Chapter 19

SAMPLING PROCEDURES : PRE-WETTING

19.1. If, coal is graded on ash-cum-moisture basis, as at present, the ascertainment of moisture when the coal is despatched from colliery becomes a matter of importance, since price would be based to some extent on this assessment. It has latterly been the practice of the Central Fuel Research Institute, Dhanbad, to pre-wet the samples and to stabilise the moisture at a specified humidity at a given temperature, and for a given time, to settle the moisture content. This method has been a matter of grievance with the collieries which maintain that the saturation downgrades the coal, since the moisture thus evaluated is (it is claimed) significantly higher than when the coal leaves the collieries. In fact, it is contended that the fall in production of Sel. A and Sel. B coal is due to some extent to the method of testing, and not due to any real drop in production in these grades. On the other hand, consumers have complained that coal is wetted, at the time of despatch by some collieries, more than it should be for reasons of preventing fire hazards, with a view to securing an increase of weight a form of adulteration. We have discussed this issue with Dr. Lahiri, the Director of the Central Fuel Research Institute, the J.W.C., and the Coal Controller. Correct determination of moisture in coal is fraught with difficulties due to the spongy (microporous) nature of coal, and the changes (synchysis) which it undergoes with drying.

19.2. *Types of moisture in coal.*—As we understand it moisture in coal can be of three types :—

- (i) free moisture which is often visible;
- (ii) inherent or saturated moisture when the coal is freshly mined, and
- (iii) equilibrium moisture, *i.e.*, the moisture held mainly by surface absorption, over and above the moisture in the micro-capillaries, and generally determined by subjecting the coal to equilibration at a standard relative humidity at a given temperature.

The first type of moisture is entirely fortuitous and can be removed by drying. It has no bearing on gradation and is of importance only in the sale of washed coals, particularly if the coal is in a fine ground state. Washed coals are, therefore, bought and sold on a "maximum free moisture" basis. We understand that moisture content fluctuates with atmospheric conditions and depends on current humidity and temperature conditions. Exposure to the atmosphere generally adds to the moisture content of coal since coal is hygroscopic, but this is also not taken into consideration when tests are made for the purpose of grading. The third type of moisture, viz., the Sorbed Equilibrium Moisture, is what is of relevance in grading at present. We understand from the Director of the Central Fuel Research Institute that it is always lower than the actual moisture in coal as despatched from the mines, since a certain amount of moisture is removed during the pre-test drying. Evidently, determination of this moisture is difficult due to the micro-capillary nature of coal, the effects of storage, and tendency of oxidation to changes of surface tension and collapse of capillary structures. Besides, the moisture content will vary depending on whether the coal is first dried and allowed to pick up moisture, or saturated with water and allowed to reach equilibrium by evaporation. We understand that the former will be somewhat lower than the latter.

19.3. *Tests for moisture.*—It is of importance to any scientific test that it should be so devised that the test should be convenient and the results provide a repeatable consistent figure. The standard test devised by the Indian Standards Institution is to secure a dependable test figure which will *remain* the same if repeated with the same sample for different parts of the same sample. This is of importance because one of three samples retained by the seller would have to be tested in case of dispute over the results of the sample sent to the industry or the consumer. The I.S.I. test for measurement of moisture is therefore based on "pre-wetting" i.e., saturation of the sample with moisture, so that the pores are filled, and then equilibrating it by storage at a fixed humidity for a given time at a given temperature.

19.3.1. It seems to us that the I.S.I. test is a good test. The coal industry's objection is not that the test is unsound,

but that when the present commercial system was introduced, the measure for moisture content was different and lower. It wants either a tolerance in grading of samples for moisture, or a change in the yardstick for price gradation. On the other hand, the Director of the Central Fuel Research Institute is of the view that the present gradation which depends on the saturated moisture at the time of loading works against the consumer, since he buys on the basis of estimated moisture irrespective of what is loaded, and at a time when the freshly mined coal is fully saturated. He is also of the view that the moisture at that stage is invariably more than the equilibrated moisture after pre-wetting, and that, therefore, even the pre-wetted test is slightly in favour of the seller. According to him, the difference will not be very significant, and as regards the effect of pre-wetting itself, the difference between a pre-wetted sample and a dry sample may be as high as 0.5 to 1.5 per cent only in the case of the coal of the outlying coal fields in Madhya Pradesh and Maharashtra, though even with these coals there would be no consistency in the moisture content of dry samples tested as they are without pre-wetting.

19.4. After considering all aspects, and the arguments on both sides, we have come to the conclusion that the pre-wetting of samples is scientifically sound and commercially desirable, and in settling the price structure we have taken this aspect fully into consideration.

Chapter 20

PRESENT COSTS OF PRODUCTION

20.1.1. We selected 40 units for detailed cost examination. Of these three units had to be dropped as the parties were not sufficiently co-operative with our Cost Accounts Staff. The selected units included 18 units selected from the alternatives suggested by the J.W.C. and 29 of the units suggested by the Coal Controller. Eight of these are common to both lists. Kargali, a public sector unit was added by us. 24 of the costed units (including two public sector units) were from Bengal and Bihar, one from Assam, one from Andhra (the only one in the State) and eleven (including one public sector unit) from other outlying regions. The units located in Assam and Andhra represent the consolidated costs of all the units operated by the Assam Railways & Trading Co. Ltd., and by the Singareni Collieries Co. Ltd., respectively. The periods for which costs were worked out were generally the financial years ending either December 1965 or later in the year 1966. For a few units the period taken was six months ending April 1966 and for two units a period of twelve months ending a few months earlier than December 1965.

20.1.2. We had requested 60 other units to furnish the details of their costs of raising in certain proformae supplied by us with the intention of covering 100 units altogether. These included all the units out of the alternatives suggested by the J.W.C. not taken up for detailed cost examination directly by our Cost Accounts staff, all the other units suggested by the Coal Controller, and units taken from those studied by the previous committees or study groups appointed by the Government. At our various meetings we made it clear to the industry that any unit not included in the list of 60 was free to send us data in the same proforma and these would be duly studied by the Commission. The response was, however, very poor as stated in Chapter 4 and amongst those who responded there were a number of units who furnished the data in so incomplete and casual a manner that no use could be made of them. Ultimately we were in a

position to study the results of 12 uncosted units from Bengal and Bihar and 5 units from the outlying regions which were *prime facie* reliable, though even in some of these cases the data were defective in one respect or another.

20.1.3. The resulting sample of units for Bengal and Bihar region was heavily biased towards mines with difficult conditions. This was perhaps to be expected. For, from amongst the 60 units who were requested to submit data of their costs, those who did so should perhaps have been desirous to bring the high proportion of their costs due to difficult conditions to the Commission's attention. This was also true for the units selected by the J.W.C. During the year 1965/66, 181 units were in receipt of subsidies due to difficult conditions. A majority of these units were located in the Bengal/Bihar region which accounts for 720 units. Since units whose production is below 1,000 tonnes would normally not rank for any subsidy, under the conditions prescribed, the number of units which could possibly take advantage of the scheme of subsidies would not be more than about 480. Adjusting for the number of units in the outlying regions which are known to receive subsidies as revealed in their cost sheets, the percentage of units receiving subsidies in the Bengal/Bihar region would not be more than 36%. As against this, the number of units with difficult conditions was 71% of the units selected by the J.W.C., 68% for-all costed units and about 67% of all costed and non-costed units in the private sector whose costs we have studied. We have eliminated stowing costs in full, and subsidies actually received for other difficult conditions of mining. There should therefore be no ground for any complaint that the selection of the units is unrepresentative. As regards differences in costs due to the stage of mining at the collieries and the methods adopted for operating them, the manner in which the units have been selected on the suggestions of the Coal Controller and the Joint Working Committee, and a comparison of these costs with those of the non-costed units who have submitted their costs, show that the figures arrived at by us are representative.

20.1.4. The actual costs were discussed with those of the respective units which presented themselves before the Commission for the purpose. In one case the wages costs appeared

to be high because of falling production without a corresponding reduction in the labour strength. In another case where the costs were comparatively high, the directors' report stated that the operations of the mine were being re-organised and that the beneficial results of such re-organisation and development would accrue only after some time. It was noticed in the case of a few of the units that the proportion of contract labour utilised was unusually high compared to the general run. These units represented that such work if undertaken by the regular employees of the colliery would have cost more. Since such contractors also have to comply with all the regulations of the labour laws and mining rules and should have made profits, we are not sure that the costs would have been more if the work had been undertaken by the colliery itself. It is of course true that for tasks of a non-recurring nature or those arising at long intervals, it would be cheaper or convenient to engage contractors. However, we have seen that in a majority of the cases the incidence of such contract labour is small.

20.1.5. *Adjustments made.*—We have made the following adjustments after discussions with the units :

- (a) Quite a number of units have retrenched some staff with retrenchment compensation. We are of opinion that such compensation paid in the costed period cannot form part of the cost structure on the basis of which prices for future are to be determined. One reason is that this is a non-recurring item of expenditure, which is largely compensated by the reduction of future costs, and the element in the costs of the costed period which enter the cost structure representing the wages paid before retrenchment without repetition in the future. Some units argued that as mechanisation progresses it would be necessary to retrench labour each year and therefore this element should be included in the costs. This is not a tenable position. Retrenchment is effected after taking into account the economies that are to be achieved thereby and if the management's decision is sound, as it should be, the costs of mechanisation including all elements would be fully

compensated by the economies of the retrenchment, and on the balance even lead to a lowering of costs per tonne. Our cost examination of mechanised units shows that this actually happens. A third line of argument is also put forward, namely, that ultimately when a mine is exhausted all the labour in position will have to be retrenched with compensation. We do not consider it would be right to include any unit for purposes of determining the price structure if it is on the point of being exhausted and closed down within the next few years since this will be a case by itself. In any case such reduction of labour occurs gradually, and with some forethought transfer to other workings or other mines should be easy in an expanding industry. By the very nature of the industry provision for such compensation should be made every year out of the profits of the year for such a future contingency. It is neither possible nor necessary to make any reasonable provision in the costs for such purposes in the case of running mines when dates of exhaustion are distant or not known.

- (b) A number of units have incurred expenses under the head "Recruitment Commission" mainly for purposes of recruiting Gorakhpuri labour. The industry represented that such labour is essential for efficient operation of the mines particularly for certain types of tasks and we have admitted such expenses. But we also came across another class of Commission paid at the rate of a certain sum per tonne of coal despatched for a certain guarantor of labour. We have carefully considered the representations made in this respect and feel that such payment is in effect a mere distribution of profits for reasons which are not apparent. While the incidence of the former type of recruitment commission was generally not significant, in the case of the latter type of commission the incidence per tonne is considerable and has no proportion to the services, if any, rendered.

- (c) In certain cases it was noticed that assets in the form of coal cutting machines, etc. were hired from third parties on a rental basis. In one case where the unit is a partnership concern such assets were hired from one of the partners, not at a fixed rent per month but in the shape of a fixed charge per tonne of coal despatched. Having regard to the relations between the owner of the assets and the unit concerned, we feel that this is also a case of distribution of profits. We have excluded this rent and allowed normal depreciation on the written-down value of the assets. We have also decided that the written down value of the assets should rank for return on capital.
- (d) In one case it was noticed that the repair charges on buildings were unusually high both in relation to the total written-down value of the buildings and also as compared to similar charges incurred by other units. After careful consideration of the representations made by this unit we were convinced that some amount of a capital nature has in fact been brought under maintenance charges and written off by this unit. We have made reasonable adjustments in the repair charges. Depreciation has been allowed on the balance of the amount which, of course, will also rank for return.
- (e) Some other minor adjustments have also been made in the costs after discussion with the parties. For example, some of the units which originally stated that there was no free issue of coal to the workers, subsequently represented that the production shown is only net of free issues to the workers. In such cases the quantity of gross raisings has been suitably amended.

The cost structure as evolved by us is exclusive of royalty and any brokerage or commission on sales or despatches (including so-called "supervision charges on despatches" which in many cases are only a device to reduce the price to a consumer below the controlled price)

20.1.6. From what has been stated in para 20.1.1 regarding the periods of costing it will be seen that although the costs can be stated to have been worked out generally for the period 1965-66 the actual periods are somewhat different from unit to unit. One of the important elements of wages cost *viz.*, variable dearness allowance varies from period to period in accordance with the cost of living index. The variations in the costed periods are bound to create a distortion in any comparative study of the costs. In order to eliminate such causes for distortion and also to facilitate future adjustments of this element, we have adjusted the costs of all the costed and non-costed units to the variable dearness allowance payable at the seventh slab *i.e.* at the rate of Rs. 1.33 per manshift.

20.2.1. *Wage Cost.*—We have made a detailed analysis of the wages cost at the various stages both underground and on surface as far as was possible with the available data with a view to locate the reasons for any variation in the wages cost of the different mines. Initially we tried to correlate the piece wages paid to the pick miners, c.p. miners and loaders with the gross raisings shown by the costed units. Such correlation is possible only in those cases where mechanical methods of loading are not employed. For the costed units in Bengal/Bihar the actual gross raisings were found to vary narrowly between (+) 4% to (—) 3% compared to the calculated quantities that could have been obtained on the basis of piece wages paid if a tub of 36 c. ft. be assumed to contain 0.9 ton coal. In the outlying regions, however, the differences were much more and varied from about (+) 3% to (—) 28%. While the variations in the Bengal and Bihar regions could be explained by the lack of a strict relationship between volumetric and gravimetric measures, the variations in the outlying areas could not be explained in this way. We called for explanations from the concerned collieries. While some of the collieries explained it to the presence of belts of shale removed from the coal after despatch to the surface, the other collieries stated that the specific gravity of coal in the respective units was much lower than assumed by us. For example, one unit stated that in its case a tub of 36 c. ft. would contain only 0.7 tonne coal. Singareni Collieries stated that in their case a tub of

36 c. ft. contains only 0.75 tonne. A consequence of the above variations is that even in the case of piece-rated workers, the incidence of wages including only the elements of variable dearness allowance and interim wages on a manshift basis need not necessarily be in the inverse ratio of the O.M.S. for those workers. One unit may have to fill more tubs than another unit where a lesser number of tubs would suffice to fill the quantity raised in a manshift; the piece wages payable being related to the number of tubs filled (and not weighed quantities), will be more in the former case than in the latter case for the same quantity of coal making the costs correspondingly higher or lower as the case may be. The same result follows also from the fact that the composition of the time-rated workers as between the different categories (with different scales of pay) is different in the different units, the total payment of wages for any particular number of manshifts will necessarily differ from unit to unit.

20.2.2. Superficially the costs worked out do not appear to be uniform but on a closer analysis a number of apparent variations could be sorted out particularly in the elements of wages and stores. For example, it is clear that at the coal face the wage cost per tonne of coal is higher in the case of coal won by pick miners than when it is obtained by blasting and loading with the use of coal cutting machines. But this extra cost is partially counterbalanced by the reduction or avoidance of expenditure on explosives, often considerable, required in the other methods, as also the cost of spare parts and maintenance for drill and coal cutting machine. There is also another compensating factor in the form of depreciation on the coal cutting machines used which we could not segregate and study. It is, however, clear that the incidence of the actual wages per tonne in the case of any particular unit will depend upon the proportion in which coal has been obtained by one or the other method. In the case of a few units where coal face costs in a depillaring area and at a development gallery face could be separately studied it was found that the costs (excluding costs of stowing) for obtaining coal from the depillaring area were usually lower than the costs pertaining to the gallery face. This of course is to be expected. Again the actual incidence

of wages depend on the ratio in which the coal is obtained from the two areas respectively. Most of the costed units have their own workshops. In some cases, however, the workshop is located at a central office for a group of collieries and charges are made to the respective collieries for the items supplied or for the repairs done to equipment used by them. To wage costs in the case of collieries of the former category will naturally include the wages of the operators in the workshop also. This would be absent in the latter categories of collieries while expenses booked under stores or repairs and maintenance would be more. In the case of one unit which operates sophisticated machinery like the 'Anderson Shearing Machines' with automatic systems of loading on to conveyors etc. the wages cost is very low compared to that in all the units in the region; but the costs of stores, depreciation and other overheads are so high that for its O.M.S., it would appear to be a high cost unit. Incidence of the cost of stores may differ for a variety of reasons including what is mentioned in regard to the location of workshop, proportion of coal obtained by pick mining, etc. One of the apparent anomalies in this regard was that the incidence of cost of explosives per tonne of coal showed a lower figure for a number of gassy mines than for some of the non-gassy mines. This goes against technical opinion and commonsense. However, on a closer scrutiny the anomaly resolved itself. For example, in the Bengal and Bihar region we examined the costs of two gassy units where the costs of explosives per tonne of coal raised were Rs. 0.90 and Rs. 0.37, respectively; for two other non-gassy mines, the incidences were Rs. 0.76 and Rs. 0.50, respectively. It is already seen that in pick mining the consumption of explosives was nil or negligible. In the above four cases when we related the total consumption of explosives to the quantities which were raised by means other than pick mining *i.e.*, to the quantities for which blasting was required, the incidence per tonne of coal worked out to Rs. 1.00 and Rs. 1.04 in the case of the two gassy mines and to Rs. 0.86 and Rs. 0.81 respectively for the two non-gassy mines. The costs of explosives for gassy mines were therefore higher than those for non-gassy mines, as it should be. From what has been said in this paragraph it is evident that it would be futile to attempt to establish separate norms for the elements of wages, salaries,

stores, depreciation etc., because these are interdependent on very many factors including methods and equipment employed for extraction of coal, which may cause an increase in one element with a compensating decrease in other elements. We, therefore, have come to the conclusion that the method adopted by the C.P.R.C. of settling norms under each of the heads of costs can only be rough and ready, and that it is preferable to consider only the total costs of raising coal where in the compensating factors affecting different elements of cost may neutralise each other to the extent possible, and a fair average of the extra costs arrived at.

20.2.3. We have dealt with briefly in paragraph 4.3, on the heterogeneous nature of the industry. We would like to elaborate on this at this stage. No two collieries are alike in all respects. Apart from the differing gassiness of mines, the necessity for stowing, the depths of the shafts, the thinness of the seams (which may involve payment of difficulty allowance to the workers), the steepness of slopes of the seams, the requirements for incurring extra cost for pumping etc. (all of which are usually termed difficult conditions of mining), the costs depend upon many other factors such as the distance to be travelled by the workers to arrive at their working place, the lead and lift involved, the number of levels in which the mine is working, the necessity of protection against fire in the surrounding areas etc. The expenses on labour amenities such as provision of creche, hospital, canteen, school, etc. also differ widely for the different collieries. Again, while some of the units have provided all their workers with head-gear and shoes as required under the law, in many cases the expenses have not been incurred for good or bad reasons. The methods of administration for the different units are also different involving different quantum of expenses. There are units with head office located at the colliery site with, so to say, only one tier of administrative expenses. Others incur administrative expenses both at the colliery and also at the head office. Yet others have their administration in three tiers, one at the colliery site itself, another at a central office supervising the activities of a number of collieries under the same management and then at the head office at a different place. Again even at the same mine

costs will differ widely from the development stage to the exploitation stage and the last stages of depillaring and exhaustion. With such diverse factors together with the aspects mentioned in paragraphs 20.2.1. and 20.2.2. affecting the costs, it is scarcely to be expected that the costs of the different units will neatly fall behind one another according to O.M.S. The variables involved are too many and it is impossible to segregate the effects of special factors to study them. However, one important fact is that in the majority of cases the element of wages constitutes more than fifty per cent of the costs of production. Therefore by and large, there should be a tendency for costs to fall with rising O.M.S. We decided to study if there was a definite pattern or trend in this respect before ascertaining if a fair cost for any particular range of O.M.S. could be settled in variance with the system adopted by the C.P.R.C.

20.2.4. The task of ascertaining such trends would have been considerably facilitated if it were possible to eliminate the disturbing effects caused by the various difficult conditions and other factors which could be studied and dealt with separately. Amongst the difficult conditions it is possible to eliminate completely the expenses caused by the necessity of stowing for which the costed units have furnished complete details. We found it however next to impossible to assess separately the extra expenses due to the other difficult conditions. For example, a mine with a not very deep shaft will incur expenses more or less of the same character as those incurred by a really deep mine but these expenses may be relatively higher in the latter case. Again, pumping out of water is necessary in almost all cases but the expenses do not depend on any measurable factor. No doubt such expenses will be neutralised to an extent by the subsidy received but one cannot be sure that the effect of any particular difficult condition will be eliminated completely by the subsidy. In fact the very scheme of subsidy in respect of extra pumping cost envisages only a partial compensation of the extra cost. We have therefore come to the conclusion that there is no other alternative to dealing with costs on the basis of the total expenses of these mines after deducting the subsidies received to counteract the higher cost to the extent possible. Thus in trying to decide if a

trend or pattern exists we have deducted the varying expenses of stowing from the respective elements of costs removing a major cause of variations in the costs. We have also eschewed another factor which is responsible for large variations in the costs which is the free issue of coal to the workers. Some units do not issue any coal free to the workers while others make free issues costing as much as Rs. 1.50 per tonne. We have dealt with the question of the stowing subsidy and the cost of free issue of coal to the workers, separately. Trends that will be established are for costs excluding cost of stowing and cost of free issue of coal to the workers but including any shortfall of the subsidy received compared to the actual extra expenses incurred for other difficult conditions.

20.2.5. Manshifts have not been furnished by the costed units in the case of wages paid under contract excepting in a few cases. In calculating the O.M.S. of the respective units we have estimated, where necessary the manshifts for the contract workers in ratio of the total wages paid for the regular employees of the unit. Similarly, since the costs to be dealt with are exclusive of costs of stowing, we have adjusted manshifts estimated for stowing operations in the same manner to ascertain the real O.M.S. of the respective units. These adjustments were essential if costs and O.M.S. are to correspond and be comparable between units which stow and units which have no necessity for stowing.

20.2.6. In our study of the cost structure we have decided to keep aside the costs of the three public sector units costed by us. Two are in the Bengal—Bihar region. The cost of one of them was the lowest of all costed units in the Bengal—Bihar region and appeared to be due to its special advantages. As regards the other unit the costs appeared to be high in relation to its O.M.S. and we were not completely satisfied with the rather high incidence of depreciation in relation to its cost of wages. The third public sector unit costed was in the outlying regions. Here again the cost was the lowest amongst all units costed in that region. We feel that the mechanisation and the methods of operations in these three public sector units, their sizes etc. are so different from those of the private sector units that to use them to settle a pattern or trend would lead to errors. We have therefore excluded these units from the scope of our study.

20.3. In attempting to discover if there was a pattern or trend of costs, the method we adopted was to gradually enlarge the range of O.M.S. and take simple and weighted averages for the units falling within the range. It was then found that there was a clear trend for ranges of variations of 0.10 tonne in the O.M.S. In studying this trend, when only one unit happens to fall within any range of O.M.S. we are of the view that it cannot be treated as so reliable as when a number of units fall within the particular range.

20.4. *Bengal and Bihar Regions*

20.4.1. We have studied separately the trends of costs for the units recommended by the J.W.C., for all the costed units including the J.W.C. units and for all costed and non-costed units. In doing so, the purpose was to see how the average costs change with the inclusion of fresh sets of units and also to see if the variations between the different sets of averages could be explained by the nature of the units included at the successive stages. Table Nos. 24, 25 and 26 show the three stages together with a brief description of the number and nature of units included at each stage. It will be seen that for the J.W.C. units there is a clear trend of diminishing costs with increasing O.M.S. In the second table which covers all the costed units, the trend is broken only at the range of O.M.S. between 0.90 and 1.00 tonne. This unit falling within 0.90 and 1.00 is the deepest mine in India and is highly mechanised. It is gassy and has to spend considerable sums in pumping out water. The cost of wages in this unit is quite low, yet the cost of stores, depreciation and other overheads, as already mentioned earlier, has made this unit uneconomical for its O.M.S. Obviously, in the conditions in India where wages are low the use of such sophisticated machinery with large consumption of imported stores and spares and high depreciation, will only become economical at a much higher level of production than has been achieved by this unit. If we compare the costs in the other ranges, the rise and fall compared to the costs shown for the J.W.C. units can be largely explained with reference to the nature of the units added. For the range between 0.30 and 0.40 tonne O.M.S., as both the units added are without any difficult conditions, the costs should have fallen. Instead the simple average of the costs has

increased though the weighted average has fallen. The reason is that of the two added units one unit with a production of barely 1,444 tonnes per month is a very high cost unit, with a high incidence of salaries and overheads, and with the incidence of power and fuel highest amongst all the costed units, even though the methods of operation are extremely primitive. One would be justified in excluding this unit from any cost study. However, in the weighted average the effect of the small production of the high cost unit has been negligible and there is a reduction in average cost. In the next range between 0.40 and 0.50 the costs show a fall because the sixth unit added is without any difficult condition except stowing. Since, as already stated, we have eliminated the expenses of stowing, in effect this amounts to an addition of a unit without any difficult condition. Lastly, comparing the costs for the ranges between 0.50 to 0.60 and between 0.60 to 0.70, the fall is only marginal. But if we compare the nature of units falling in the two ranges, it will be seen that the proportion of units with difficulties of gassy nature, depth and extra pumping is higher amongst the units falling in the second range; the difficulties excluding stowing are also greater. We would also observe that while in the range 0.50 to 0.60 the coal extracted from development galleries is only 39% of the total raisings, it is 63% for the other range.

20.4.2. Now coming to the last table showing the simple and weighted average of all the costed and non-costed units (for which figures were obtained on proforma), it is noticed that the trend has apparently broken at the range 0.60 to 0.70. This is due to the fact that all the three units added to this group are deep mines of a gassy nature and one with extra pumping. Thus while for the range 0.50 to 0.60 tonne O.M.S., out of nine units only three are gassy, three deep and two have to incur extra pumping cost, for the range 0.60 to 0.70 tonne O.M.S. out of five units four are gassy, four are deep mines and two have to incur extra cost for pumping. Moreover, out of these three added units two belong to a group, several units of which have been examined by our Cost Accounts Officers. In each of these units it was noticed that it is the practice to book certain items of stores on a pre-determined basis in the cost sheets of the respective units though the actual expenses were much less than

provided for. It is likely that the costs submitted by this group for the non-costed units also include such extra provision and it is probable that if these could be eliminated the average would have been lower. We have already dealt with the unit falling in the range 0.90 to 1.00 O.M.S. while discussing the trend for all the costed units. The unit falling within the range 0.80 to 0.90 also has the same degree of mechanisation but the cost in this case is perhaps somewhat lower as this unit operates one seam by conventional methods, through an incline. In the case of this unit also it is likely there is excess provision for stores than the actual.


20.4.3. All considered our study of three sets of figures shows that there is no significant variation in the average costs for any range of O.M.S. even though varying numbers of units have been added at each stage. This shows that the average costs worked out for the various ranges for all the costed units are a good basis for fair costs for those ranges except in the case of the last one, subject however to the condition that the proportion of mines with difficult conditions is high in the sample. In particular for the ranges of O.M.S. between 0.40 and 0.50 and between 0.50 and 0.60 where in the number of units happen to be larger than elsewhere, the averages are in our view reliable.

20.4.4. On the basis of figures published by Chief Inspector of Mines, for the last quarter of 1965-66, (Jan. 1966 and March 1966) the average O.M.S. for the Bengal and Bihar region was about 0.54. Adjusting for the high O.M.S. of the public sector units which are new and mechanised we have found that for the year 1965-66 the O.M.S. for the private sector units in this region was about 0.49 tonne. Interpolating from the figures established for all the costed units, the fair cost excluding stowing cost and free issue of coal at this O.M.S. would be :

With the series of simple averages Rs. 22.94

With the series of weighted averages Rs. 22.71

In the weighted average series, the cost of a few units with large production will tend to pull up or down the costs of a larger number of units with lower production. We are, therefore, of the opinion that for arriving at a representative cost the simple average series is preferable. To get the cost excluding stowing expenses only, the cost of free issue to the workers has to be added. The simple average of free issues to workers for costed units falling within the range 0.50 to 0.60 O.M.S. was only Rs. 0.19 and for the range 0.40 to 0.50 O.M.S. it was Rs. 0.43; but the simple average of all the costed units worked out to Rs. 0.42. As the free issue appears to follow to pattern, we have added the average of all the costed units to the simple average figure above to get the total fair cost excluding stowing expenses which works out to Rs. 23.36.



20.4.5. As the Bengal and Bihar region is the major source of coal in India we have given considerable thought before arriving at the cost excluding stowing expenses and free issue of coal to workers for O.M.S. 0.49 mentioned in the previous paragraph and treating it as representative, but for any weightage arising out of the representation given to the mines with difficult conditions. We have tested the reasonableness of the cost in several ways. It will be seen from the statements that the largest number of the costed units fall within the range of O.M.S. from 0.40 to 0.60. The simple average O.M.S. of these units is 0.4900 and the simple average cost Rs. 22.94 exactly ties up with the representative cost arrived at by the method of interpolation in the last paragraph. If we take all the costed and non-costed units in this range, the simple average works out to Rs. 23.01 for 0.4861 O.M.S. and the interpolated cost for this O.M.S. is Rs. 22.98 per tonne, the difference being marginal. Lastly by separating the variable and fixed expenses in the cost structure of each unit it is possible roughly to estimate the cost that would have resulted if the O.M.S. was increased or decreased, as the case may be, to 0.49 or for any other O.M.S. For example, the piece wages should vary with the output and only the elements of variable dearness allowance and the interim wages would remain fixed per shift when the productivity (*i.e.* the O.M.S. of this category of

workers) increases or decreases. Stores and repairs should increase with the production though not absolutely in proportion. Similarly, it may be assumed that power, fuel charges and cesses should largely vary with production. In this way making reasonable assumptions we have estimated the costs (excluding stowing expenses and free issue to workers) of all the costed units for an O.M.S. 0.49 tonne (excepting the unit between 0.9 and 1.00 O.M.S. which does not fit into the pattern because the degree of output does not match the degree of mechanisation), the simple average being Rs. 22.90. Considering the limitations in completely identifying the variable, semi-variable and fixed elements of cost on the basis of cost reports only, the closeness of the results with that obtained by interpolation for this O.M.S. is truly remarkable. We are thus satisfied that the cost, excluding sand stowing expenses and free issues to workers determined by us at Rs. 22.94 for an O.M.S. 0.49 is fair and reasonable.

20.4.6. We have already made it clear that within the limits of the total cost the individual elements may vary. Thus, it is likely that for two different units with the same overall costs the elements of wages may be lower in one case with higher elements of costs for stores and depreciation and conversely for the other unit. As such, to arrive at any structure of costs is of no consequence. Even if we had attempted a build-up of costs on the basis of fair figures for each element, based on mere judgement, the results would not have been significantly different. As a proforma statement, the elements of costs obtained by us by interpolation between the two simple average costs for the ranges of O.M.S. 0.40 to 0.50 and 0.50 to 0.60 is shown below. It may however be mentioned in passing, that the element of depreciation in the average cost for the range 0.50 to 0.60 tonne happens to be lower than the corresponding element for both the adjacent ranges of O.M.S. 0.40 to 0.50 and 0.60 to 0.70 tonne.

TABLE 23

Proforma cost per tonne of coal excluding stowing expenses for an O. M. S. 0.49 tonne.

	Rs.
(i) Wages	14.44
(ii) Salaries	2.60
(iii) Stores	2.95
(iv) Power and Coal for boiler	0.96
(v) Depreciation	1.04
(vi) Other items	1.30
(vii) Less credits	23.29
	0.35
(viii) Free issue of coal to workers	22.94
	0.42
(ix) Total cost excluding stowing expenses	23.36

TABLE 24

(Table referred to in para 20.4.1)

The trend of costs excluding stowing expenses and free issue of coal to workers for all J. W. C. Units in the private sector.

(Bengal & Bihar region)

1. Range of O.M.S.		Less than 0.30 tonne	More than 0.30 tonne less or equal to 0.40	More than 0.40 tonne less or equal to 0.50	More than 0.50 tonne less or equal to 0.60	More than 0.60 tonne less or equal to 0.70	More than 0.70 tonne less or equal to 0.80
2. Nature and Number of units		1 unit gassy and Thin Seam.	2 units with one quarry and the other gassy, Thin Seam, Deep & Extra pumping	5 units out of which 2 gassy, 2 inclined seams, 2 deep mines, 2 extra pumping and 3 stowing.	5 units out of which 1 gassy, 2 deep, 1 Thin seam, 1 extra pumping & 3 units stowing. One of the units has to undertake protective measures against fire in surrounding areas.	One unit gassy with stowing.	
3. Actual average O.M.S.—							
Simple		0.2807	0.3410	0.4449	0.5204	0.7367	
Weighted		0.2807	0.3408	0.4520	0.5275	0.7367	
4. Total costs excluding stowing expenses & Free issue to employees—							
Simple		Rs. 31.64	Rs. 24.98	Rs. 24.20	Rs. 22.76	Rs. 17.78	
Weighted		Rs. 31.64	Rs. 25.00	Rs. 23.63	Rs. 22.78	Rs. 17.78	
5. Percentage of mines with difficult conditions other than stowing.		100%	50%	80%	40%	100%	

6. Average proportion of raising from—	Simple		Weighted		Simple		Weighted		Simple		Weighted	
Dev. gallery %	.	.	.	100	50	50	51	36	30	35	53	53
Depillaring %	53	63	59	47	47
Quarry %.	50	50	49	11	7	6	..	..



TABLE 25

(Table referred to in para No. 20.4.1)

The trend of costs excluding stowing expenses and free issue of coal to workers for all costed units in the private sector
(Bengal & Bihar region)

1. Range of O.M.S.	Less than or equal to 0.30 tonne	More than 0.30 and less or equal to 0.40	More than 0.40 and less or equal to 0.50	More than 0.50 and less or equal to 0.60	More than 0.60 and less or equal to 0.70	More than 0.70 and less or equal to 0.80	More than 0.80 and less or equal to 1.00
2. Nature and Number of units.	1 unit gassy & 1 thin seam	4 units with one quarry, one gassy, thin seam, Deep mine & extra pumping. Besides one unit has to undertake protective action against surrounding fire.	6 units out of which 2 gassy, 2 inclined seam, 2 deep mine, 2 extra pumping, & 4 stowing.	7 units out of which 2 gassy, 3 deep mine, 1 thin seam, 1 extra pumping & 5 stowing. Besides one unit has to undertake protective action against surrounding fire.	2 units with one gassy, Deep mine & extra pumping.	1 unit gassy & 1 unit stowing.	1 unit gassy, Deep mine, extra pumping & stowing.
3. Actual average O.M.S.—Simple Weighted	0.2807 0.2807	0.3467 0.3457	0.4455 0.4514	0.5282 0.5312	0.6429 0.6428	0.7367 0.7367	0.9199 0.9199
4. Total cost excluding stowing expenses and free issue to workers—Simple Weighted	Rs. 31.64 Rs. 31.64	Rs. 25.65 Rs. 24.24	Rs. 23.47 Rs. 22.94	Rs. 22.48 Rs. 22.46	Rs. 22.44 Rs. 22.45	Rs. 17.78 Rs. 17.78	Rs. 22.24 Rs. 22.24
5. Percentage of mines with difficult conditions other than stowing	100 %	25 %	66.7 %	43 %	50 %	100 %	100 %

6. Average production obtained from	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple	Simple	Weighted Simple
Dev. Gallery (%)	100	66	66	36	34	39	43	63	63	53	53	47	47	53	22	22	22	22	22	22
Depillaring (%)	..	..	..	54	52	55	51	37	37	47	47	47	47	47	78	78	78	78	78	78
Quarry (%)	..	34	34	10	14	6	6	..	..	..	..	..	..	..	..	..	..	..	..	..



TABLE 26

(Table referred to in para No. 20.4.1)

The trend of costs excluding stowing expenses and free issue of coal to workers for all units costed and non-costed in the private sector

(Bengal & Bihar region)

1. Range of O.M.S.	Less than or equal to 0.30 tonne	More than 0.30 & less or equal to 0.40	More than 0.40 & less or equal to 0.50	More than 0.50 & less or equal to 0.60	More than 0.60 & less or equal to 0.70	More than 0.70 or less than 0.80 or less than 0.90	More than 0.90 less than 1.00	
2. Number and Nature of units	1 unit gassy & Thin seam	6 units with one quarry, 3 gassy, 1 Thin seam, 1 Deep mine, 2 extra pumping. Besides one unit has to undertake protective action against surrounding fire.						
3. Actual average	0.2807	0.3632	0.4423	0.5300	0.6350	0.7329	0.8712	0.9199
	0.2807	0.3679	0.4446	0.5311	0.6368	0.7322	0.8712	0.9199
4. Total costs excluding stowing expenses & free issue to workers	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
	31.64	25.32	23.99	22.02	22.74	18.81	19.11	22.24
Simple	31.64	24.94	23.62	22.12	22.53	18.99	19.11	22.24
Weighted								

5. Percentage of mines with difficult conditions excluding stowing . . .

100% Simple	Wei- ghted	50% Simple	Wei- ghted	66-7% Simple	Wei- ghted	44-4% Simple	Wei- ghted	80% Simple	Wei- ghted	100% Simple	Wei- ghted	100% Simple	Wei- ghted
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6. Average proportion of production obtained from :—

Dev. Gallery (%)	100	100	72	71	*	*	46	50	*	*	44	42	33	33	22	22
Depillaring „	..	..	5	9			49	45			56	58	67	67	78	78
Quarry „	..	..	23	20			5	5								

* One each of the non-costed units in the ranges 0-40 to 0-50 and 0-60 to 0-70 have not furnished the data.

20.5. *Outlying Regions :*

20.5.1. Now taking up the costs for the outlying regions, only two units in this region were selected on the recommendations of the J. W.C., one falling within the range of 0.40 and 0.50 tonne O.M.S. and the other within the range of 0.60 and 0.70 tonne O.M.S., with correspondingly low cost for the latter unit. We do not therefore propose to study separately the trends in the cost of J. W.C. units.

20.5.2. Of the 11 units costed in this region, one was a public sector unit whose cost was the least. As in the case of Bengal and Bihar regions we have excluded this unit from further consideration. The following two tables (27 and 28) show the trend of costs with the rising O.M.S., one for only the costed units and the other for both costed and non-costed units. Amongst the costed units, only two had thin seams and one had to incur extra pumping costs. One unit had to stow, but as already stated we have eliminated the stowing costs. Amongst the non-costed units there was only one unit with stowing costs. A definite trend is apparent in the accompanying table, both for the costed units and non-costed units, even though in some of the ranges there is only one unit available. Unlike the Bengal-Bihar region this trend applies to individual units. This is presumably due to the absence of unusually difficult mining conditions. We again notice that there is no violent fluctuation in the cost of any range in the two tables due to the added units in the second table. On the basis of figures published by the Chief Inspector of Mines, for the last quarter of the year 1965/66 the average O.M.S. for the outlying regions comprising of Madhya Pradesh, Maharashtra and Orissa worked out to 0.67 tonne O.M.S. Adjusting for the production and O.M.S. of the public sector units, the O.M.S. of the private sector units works out to 0.55 tonne. Interpolating from the table for the costed units the cost for 0.55 O.M.S. appears to be as shown below :

Taking the simple average series—Rs. 21.51

Taking the weighted average series—Rs. 21.47

TABLE 27
*Referred to in para 20·5·2 showing the trends of costs excluding stowing expenses
 and free issue of coal to workers (Outlying regions)*

<i>Costed units only</i>									
1. O.M.S. Range	More than 0·30 tonne but less or equal to 0·40	More than 0·40 tonne but less or equal to 0·50	More than 0·50 tonne but less or equal to 0·60	More than 0·60 tonne but less or equal to 0·70	More than 0·80 tonne but less or equal to 0·90				
2. Actual Average O.M.S.									
Simple	0·3789	0·4558	0·5518	0·6348	0·8831				
Weighted	0·3789	0·4558	0·5478	0·6348	0·8846				
3. Total cost excluding stowing exp. & free issue to workers :									
Simple	Rs. 24·51	Rs. 22·70	Rs. 21·49	Rs. 20·62	Rs. 15·91				
Weighted	Rs. 24·51	Rs. 22·70	Rs. 21·49	Rs. 20·86	Rs. 15·92				
4. Nature & number of units	1 unit Thin seam	1 unit Stowing	2 units	4 units 1 with thin seam & extra pumping	2 units				
5. Percentage of Mines with difficult conditions excluding stowing.	100%	Nil	Nil	25%	Nil				
6. Average proportion of production obtained from—									
Dev. Gallery	93%	72%	80%	85%	100%				
Depillaring	7%	8%	20%	15%	20%				
Quarry	..	..	..	..	..

The simple average of the free issues in this region worked out to Re. 0.23. Therefore the total cost excluding stowing expenses works out to Rs. 21.74 per tonne. As in the case of the Bengal/Bihar region we give below a proforma structure of the cost. It may be mentioned that the lower cost of this region compared to that of Bengal and Bihar is due to higher O.M.S. and also the load factor for piece rated workers being more, the corresponding wages per tonne are lower.

Proforma cost per tonne of coal excluding stowing expenses for an O.M.S. 0.5500 tonne.

	Rs.
(i) Wages	12.31
(ii) Salaries	3.20
(iii) Stores	2.41
(iv) Power & Fuel	1.44
(v) Depreciation	0.91
(vi) Other items	1.31
	<hr/> 21.58
(vii) Less credits	0.07
	<hr/> 21.51
(viii) Free issue of coal to workers	0.23
	<hr/>
(ix) Total cost excluding stowing expenses	21.74

20.6. *Assam*.—While discussing the actual costs of the Assam Railways & Trading Company, its representatives took objection to certain credit taken by the Cost Accounts Officer. They stated that these related to agency commission and also income from certain construction works carried out by the company. The representatives of the company were requested to furnish details of the miscellaneous income including the total debits and credits on construction work. In the details furnished, agent's commission

was shown separately together with certain other incomes which related to past years but no account of the construction work, carried out by the company was given. After carefully scrutinising each item we have adjusted the credits. The total costs worked out for the year ended March 1966 was Rs. 33.64 per tonne for O.M.S. 0.4014. The costs are very high and the representatives explained that this was mainly due to certain difficult conditions occurring in Assam coalfields which are absent in any other field. Further it is claimed that even for such difficulties as occur in other regions and are subsidised the Assam coalfields do not get any subsidy. Some statements were furnished to show that the costs are likely to be much higher in future due to restrictions on production imposed by the Coal Board. In these coalfields no coal is issued free to the workers. The structure of the actual cost is shown below :

	Actual cost per tonne (O.M.S. 4014)
	Rs.
(i) Wages	16.15
(ii) Salaries	4.10
(iii) H.O. expenses	2.57
(iv) Stores	5.35
(v) Power & Coal for boiler	1.26
(vi) Depreciation	1.06
(vii) Other items	3.51
	34.00
(viii) Less credits	0.36
(ix) Total cost excluding stowing expenses	33.64
Free Issue	Nil

20.7. *Singareni Collieries*.—For Singareni Collieries the average cost per tonne of coal excluding cost of stowing for the year 1965/66 worked out to Rs. 25.61 for O.M.S. 0.49 tonne. No coal is issued free to the workers. The costs are

very high compared to those of the other collieries in the outlying regions. The reasons for this state of affairs include those already stated by the earlier Committees, i.e. maintenance of townships, running hospitals and schools where even outsiders get civic amenities like medical treatment, schooling, etc. The structure of the costs is given below :

	Cost per tonne excluding cost of stowing
	Rs.
(i) Wages	14.19
(ii) Salaries	1.67
(iii) Stores	3.82
(iv) Power & Coal for boiler	1.07
(v) Depreciation	2.62
(vi) Other items	2.28
	25.65
(vii) Less credits	0.20
	25.45
(viii) Free issue of coal to workers . . . . .	..
	25.45
(ix) Extra cost for raising shale	0.16
(x) Total cost excluding stowing expenses	25.61

Chapter 21

SUGGESTED PRICE STRUCTURE

21.1. In the last chapter we have examined the current structure of costs of production in this industry. Before recommending the fair prices to be fixed by the Government, however, several factors have to be taken into consideration.

21.2. The first relates to costs due to expenditure on account of gassiness of a mine. The Chief Inspector of Mines has recently declared all mines to be gassy. It has been represented by the industry that expenses incurred to conform to the regulations prescribed for gassy mines are more than the subsidy granted by the Coal Board. Where relevant data was available for determining the quantity of coal raised by blasting, we have found that by relating the expenses on explosives to the quantity so raised, the costs of explosives in non-gassy mines are, on an average, less by about 13.7% compared with those of gassy mines. In Bengal/Bihar region some of the gassy mines have furnished expenses incurred by them on account of gassiness. We found, however, that the expenses shown include the total consumption of explosives, salaries of shot firers, explosive carriers etc. Such expenses have to be incurred by non-gassy mines also though the cost of explosives will be somewhat less. The extra costs, if any, for factors including explosives are already included in the case of two units each out of the two groups of units falling within the ranges 0.40 to 0.50 tonne O.M.S. and 0.50 to 0.60 O.M.S., on the basis of which the fair costs for O.M.S. 0.49 have been determined. Therefore, the extra costs incurred have to be adjusted only for that proportion of coal which is raised from the non-gassy mines or non-gassy sectors of mines included in these two groups excluding quantities which are obtained from quarries. From our discussions with the Chief Inspector of Mines it appeared that the enforcement of the regulations will be made gradually since the necessary equipment

is in short supply. Thus the required expenses will not be incurred by all mines at once. In view of the uncertainty about the extra expenses involved, and also about the time when this would be incurred, it is not possible for us to recommend any element to be included in the costs in this behalf. However, as and when any unit complies with regulations in respect of gassy mines, it will also become eligible for receiving the subsidy granted by the Coal Board. We, therefore, recommend that the Coal Board should examine the question of extra expenses incurred for gassiness and revise the scales of subsidy suitably if it be found that the present scales of subsidies are inadequate.

21.3.1. Secondly about stores, we had asked for the latest rate of stores consumed by the different collieries. However, not all the collieries have furnished the latest rates for all the items of stores consumed. Based on the percentage increases in price of stores items for those units who have furnished the relevant data we estimate that an increase of about 12% would be sufficient to adjust the present costs of stores to the period when cost investigations were undertaken. In the proforma fair cost for Bengal and Bihar region the element of stores is Rs. 2.95. But the simple average of stores for all the costed units in the private sector is Rs. 3.20. As already observed by us in para 20.4.5 the element appearing in the proforma cost may vary within the same overall cost; we have, therefore, calculated the increase on the simple average figure of all the costed units in the private sector in this region to be fair to the units with higher costs of stores, and provided Re. 0.38 on this count.

21.3.2. Similarly, to bring the cost of stores up-to-date in the outlying regions where the simple average of stores costs also happens to be Rs. 3.20 per tonne, Re. 0.38 is required to be provided for. For Singareni Collieries Ltd, and the Assam Railways & Trading Co., we have made provision similarly at Re. 0.46 and Re. 0.64 respectively.

21.4.1 We have made a departure from the price structure of the C.P.R.C. in respect of the element for depreciation. The C.P.R.C. based these on the average estimated capital investment at current costs, plus the average

estimated costs of expansion. The latter element was related to the development rebate of 25 per cent then available in the tax structure. In effect existing capital was estimated at Rs. 14 per ton of production, and the capital for expansion at Rs. 20 per ton. The two were averaged to Rs. 16 per ton taking the then existing production at 35 million tons and projected expansion at 10 million tons. This capital was then depreciated with the development rebate added to it over a period of 12 years, as a fair average period of useful life for all types of assets, and the depreciation and development allowance adopted at Rs. 1.70 per tonne. As a rough and ready method of arriving at the element of depreciation per ton of coal this was as good a method as any. However, the position today is that most if not all the capital needed for expansion during the Fourth Plan period has already been invested, and on this, as part of the employed capital, we would, following our practice at present allow both the usual depreciation and a fair margin of profit. The depreciation element is, therefore, better fixed on a norm related to the actuals than to any theoretical figure or figures as done by the C.R.P.C. The industry, however, pressed for a rehabilitation element to meet the higher cost of replacement of existing assets together with an element for new assets for development. We are of the view that an element for the higher cost of replacement would be justified and deal with this in the next paragraph. For reasons given in Chapter 16 we have considered it undesirable to include an element for expansion in the prices, but to provide for it through other measures.

21.4.2. The next issue is regarding the higher cost of replacement of machinery etc. when it has outlived its life. It has been represented to us that most of the plant and machinery employed for mining has to be imported at present and that in particular equipment specially required for gassy mines would have to be imported for some time. Even where indigenous substitutes are available the prices are high. The Commission's approach to the problem of making provision for replacement at higher rates is explained in paragraph 13 of the Report on the Cement Industry in 1961. The particulars required for such purposes were asked for by us but such particulars were not furnished

by most of the units. In some cases, the total costs of only some of the machinery purchased (probably with the help of World Bank loan) during the last few years were furnished and these in our opinion do not require replacement as yet. Therefore, if any provision is to be made, it could be done only on an *ad hoc* basis. The simple average depreciation on plant and machinery including that required for stowing for all the costed units in the Bengal/Bihar region (excluding one unit for which depreciation on plant and machinery was not separately available) was Re. 0.90 per tonne. Even for machinery which is imported, a proportion of the total cost will represent value added in "Rupees" e.g. customs duty, freight, and installation charges. Following the devaluation of Rupee the exchange value of the foreign currency element in the total cost increased by about 57.5%. Taking into account the fact that there has been a reduction in the customs duty element of some of the items, and that any rise in the other rupee costs would be much less, the overall rise in cost would be less than 57.5%. We have, therefore, provided an amount equal to the average element of depreciation on plant and machinery, i.e. Re. 0.90 per tonne on an *ad hoc* basis. Assuming corporation tax @55%, the above provision will leave a balance of 45% of the actual cost written off. This together with the tax concession available on actual replacement of any item of machinery @ 19.25% (55% of 35%) will go a long way not only to counteract the effect of devaluation but also to meet a portion of any rise in costs of the machinery.

21.4.3. The simple average of the element of depreciation per tonne on plant and machinery for the costed units in the outlying regions as also the corresponding element for the Assam Railways & Trading Co. was lower than that for Bengal and Bihar. We have however allowed the same *ad hoc* element viz. Re. 0.90 per tonne against possible increase in costs of replacement of plant and machinery. For Singareni this element worked out to Rs. 1.29 per tonne and we have allowed an additional amount of Rs. 1.29 to cover any increase in the replacement costs.

21.5.1. There are some items of cost where the variations will be minor and cannot be estimated or forecast

with any accuracy. Relating the yearly increments of the time-rated workers to the total emoluments received by them including variable dearness allowance, interim wages and colliery bonus, the percentage increase is seen to be nominal. This increase is not available to the piece-rated workers whose emoluments vary closely with their productivity. Moreover, we understand that a large proportion of time-rated workers have already reached the maximum of their respective scales. The element of wages however will fluctuate slightly with an increase or decrease in production; for with a comparatively small fall in production, say by 5%, it may not be practicable to lay off or retrench workers. Again salaries of the administrative staff will increase according to their respective scales. All charges on account of these elements of cost are unpredictable but on the whole of a minor order.

21.5.2. The cost of stores have been brought up to the time when the cost investigations were undertaken. But with spiralling prices it is possible that this may increase further. It is noticed further that, while some of the units have provided their workers with headgear and shoes in accordance with the relevant rules, most of the units have not yet met these requirements in full. No doubt, when these are provided as required by the rules, the units will have to incur further expenses.

21.5.3. To provide for all contingencies like those dealt with in the earlier two sub-paragraphs, for the next three years, we have provided a sum calculated at $2\frac{1}{2}$ of the costs, excluding depreciation, by way of an allowance for contingencies.

21.6. *Under brokerage and selling commission.*—Some of the units have shown an item of expense called "Supervision Charges on Despatches". This is a peculiar item which the Commission has not come across in any other industry. It is informally understood that in some cases the amounts actually represent the difference between the controlled price of coal and a lower price at which it has actually been sold. In a number of cases it has been noticed that commission or brokerage is not paid on considerable

proportions of the actual sales. All considered we think a commission of Re. 0.25 per tonne would be adequate for all expenses incurred as commission or brokerage for sale of coal.

21.7.1. On an examination of the balance sheets of the costed units in the private sector in the Bengal-Bihar region, it was seen that in two cases the working capital worked out to a negative figure, the current liabilities being higher than current assets. Out of the remaining 20 units, the average working capital worked out as follows :

Less than one month's cost of production .	3 units
More than one month's but less than 2 months' cost of production	6 units
More than 2 months' but less than 3 months' cost of production	4 units
More than 3 months' but less than 4 months' cost of production	5 units
More than 4 months' cost of production .	2 units
	<hr/> 20 units

The simple average of working capital for these units, excluding the two units whose working capital turned out to be negative worked out to 2.5 months' cost of production. Under normal market conditions, we would have considered a quantum of working capital at two months' cost of production as adequate. But taking into consideration the present recession which may necessitate extended credit to the consumers and occasional piling up of stocks at the pit-head, we have assessed the fair needs of working capital at three months' cost of production excluding the element of depreciation.

21.7.2. In recommending fair prices for several commodities in the immediate past, we found that a return of 15% on the capital employed comprising of the net fixed assets and the working capital would be sufficient to cover the

commitments to be covered out of the profit margin including interest charges, minimum bonus payable under the Bonus Act, Managing Agents' commission, taxation, fair dividends, etc., leaving a residue for making adequate reserves. Though the coal industry is highly labour intensive, we are of the view that a return of 15% would be sufficient to most of the collieries to cover minimum commitments and leave a residue for purposes of reserves. This compares with 11% allowed by the Coal Prices Revision Committee and 12% by the Coal Price Study Team, which returns in to-day's conditions of the money market are on the low side. It will be noticed that in the cost structure there are several cushions available. For example, the element of depreciation has been left at the figure calculated for the actual period though this should diminish with passage of time; the O.M.S. on the basis of which fair costs have been estimated is exclusive of the man-shifts for stowing and, therefore, actually corresponds to a somewhat lower figure as would be calculated for purposes of the publications of Chief Inspector of Mines; the percentage of mines with difficult mining conditions excluding stowing is higher in the sample taken than is actually the case in the industry etc. Further, we have already allowed a special element to provide for replacement of machinery and equipment at higher cost. After carefully considering all these aspects and the special nature and requirements of the coal industry we consider that a return of 15% on the capital employed, will enable the industry to generate adequate funds for progressive mechanisation and, thereby, to increase its profitability. We have dealt with the question of substantial investment for development in Chapter 16.

21.7.3. The simple average of the net fixed assets for all the costed units in the private sector in the Bengal-Bihar region works out to Rs. 13.02 per tonne. The weighted average is Rs. 12.13. Taking the simple average figure, the average fair price per tonne of coal raised in this region works out as under :

For Bengal & Bihar

Fair price excluding extra expenses for stowing :

	Rs./Tonne	
(i) Estimate of fair cost for the region in the year 1965-66 excluding depreciation	22.32	
(ii) Provision to bring the stores cost up-to-date	0.38	
(iii) Total	22.70	
(iv) Provision for contingencies @2½%	0.57	
(v) Total	23.27	
(vi) (a) Depreciation :	1.04	
(b) Provision for replacement of higher cost	0.90	1.94
(vii) Return :		
(a) On working capital @3.75% on (v)	0.87	
(b) On net fixed assets @15%	1.95	2.82
(viii) For pit-head price for average grade of coal excluding cost of stowing	28.03	
(ix) Commission & brokerage	0.25	
(x) Royalty @ 5% of F.O.R. price	1.49	
	29.77	

The question of fixation of prices of the individual grades will be dealt with later in para 21.8.

21.7.4. Before we take up the question of the prices for the outlying regions we have to consider the question of excess of expenditure incurred in stowing over what is allowed by the Coal Board as subsidy. The C.P.R.C. recommended full naturalisation of the costs of stowing. The coal Board has, however, evolved a scheme whereby actuals are paid subject to certain ceilings. Of the 22 units in the private sector in the Bengal-Bihar region, 11 units had to undertake stowing operations. The incidence of excess of expenditure over the subsidies received per tonne varied from Re. 0.23 per tonne to Rs. 2.10 per tonne. In some cases the lower incidence was caused by the fact that the expenses were averaged over the total production which

included raisings from seams where no stowing was required. The simple average of the extra expenses on stowing over reimbursements by the Coal Board works out to Rs. 1·23 per tonne for the units which actually carried out stowing operations and the weighted average was Rs. 1·03. The simple average would be halved for all the costed units in the private sector. As the number of collieries which has to carry out the stowing operations is limited, any such amount as shown above, if included in the price will only cause a windfall receipt in the cases of a large majority of the collieries who either do not stow, or stowing by whom is not considered desirable by the Coal Board. We do not, therefore, recommend inclusion of an element for stowing in the price. At the same time, it is inequitable, that the units which carry out the stowing operations in accordance with the safety measures prescribed by the government should be constrained to forego so much of the profit element allowed in the price. We, therefore, recommend that the Coal Board should review the methods of re-imbursement and evolve a system of re-imbursement which should be realistic, and encourage stowing where desirable in the national interest. We have dealt with the matter more fully in Chapter 7.

21.7.5. In the case of outlying regions the simple average of net fixed assets is only Rs. 7.24. The lower average net assets reflects the absence in general of serious difficult conditions in this region such as deep mines, gassiness, etc. and a much lower proportion of units which have to stow sand. The fair price for this region would, therefore, be as shown below :

	Rs./Tonne
(i) Estimate of fair cost for the region excluding depreciation for the year 1965-66 (para 20.5.2)	20·83
(ii) Provision to bring the stores cost up-to-date (para 21.3.2)	0·38
(iii) Total	21·21
(iv) Provision for contingencies @ 2½% on (iv) (para 21.5.3)	0·53
(v) Total	21·74

(vi) (a) Depreciation (para 20.5.2)	0.91	
(b) Provision for replacement at higher cost (para 21.4.2)	0.90	1.81
<hr/>		
(vii) Return		
(a) On working capital @ 3.75% on		
(v)	0.82	
(b) 15% on net fixed assets	1.09	1.91
<hr/>		
(viii) Fair pit-head price for average grade of coal excluding cost of stowing		25.46
(ix) Commission & brokerage		0.25
(x) Royalty @ 5% of F.O.R. price		1.35
(xi) Fair F.O.R. price for average grade coal excluding cost of stowing		27.06

As in the case of Bengal and Bihar region we shall consider the question of fixing the price of individual grades in paragraph 21.8. Out of the costed units there was only one unit which undertook stowing operations and the excess of expenditure over the reimbursement was Rs. 1.12 per tonne. We have already discussed the problem in para 21.7.4.

21.7.6. In the case of Andhra Pradesh and Assam regions, we note that in both these cases the costs are very high compared to those in the other two regions. The Singareni Collieries Ltd. in Andhra Pradesh has to compete with the neighbouring collieries in Maharashtra; and whatever may be the reasons for the higher cost of this unit, it would appear unreasonable to fix a much higher price for this region covering all the collieries in the region which happen to belong to one unit, while a lower price is fixed for the several units in the neighbouring region. In the case of Assam the cost based on a gross raising of 4.85 lakh tonnes (net raisings 4.69 lakh tonnes) is already high. But the Assam Railways & Trading Co. Ltd., expect that due to imposition of restriction on production by the Coal Controller, their costs will rise sharply in the future. The margin for contingencies provided by us is nowhere near the rise indicated by the company for its future restricted production. We would, therefore, recommend that the price in both these regions be

decontrolled, so that the collieries in the respective regions may suitably fix their own prices taking into consideration the competition from the neighbouring collieries, the advantage their buyers have in respect of transport charges because of the location of the collieries and other relevant circumstances. However, for purely proforma purposes, we indicate below the prices that would result from our calculations on the basis of the production in the actual period :

	Rs./Tonne	
(a) <i>Proforma price structure for Assam</i>		
(i) Cost for the year 1965-66 excluding depreciation (para 20.6)		32.58
(ii) Provision to bring stores cost up-to-date		0.64
(iii) Total		33.22
(iv) Provision for contingencies @ 2½% on (iii) (para 20.5.3)		0.83
(v) Total		34.05
(vi) (a) Depreciation (para 20.6)	1.06	
(b) Provision for replacement at higher cost (para 21.4.3)	0.90	1.96
(vii) Return :		
(a) On working capital @ 3.75% on (v)	1.29	
(b) 15% on net fixed assets.	2.38	3.66
(viii) Fair pit-head price		39.67
(ix) Commission & brokerage		0.25
(x) Royalty at 5% on F.O.R. price		2.10
(xi) Fair F.O.R. price for average grade of coal		42.02

	Rs./Tonne	
(b) <i>Proforma price structure for Andhra Pradesh</i>		
(i) Cost excluding depreciation (para 20·7)		22·99
(ii) Provision to bring the stores cost up-to-date (para 21·3·2)		0·46
(iii) Total		23·45
(iv) Provision for contingencies @ 2½% on (iv) (para 21·5·3)		0·59
(v) Total		24·04
(vi) (a) Depreciation (para 20·7)	2·62	
(b) Provision for replacement at increased cost (para 21·4·3)	1·29	3·91
(vii) Return :		
(a) On working capital @ 3·75% on (v)	0·90	
(b) On net fixed assets @ 15%	3·82	4·72
(viii) Fair pit-head price excluding cost of stowing		
(ix) Commission & brokerage		0·25
(x) Royalty @ 5% on F.O.R. price		1·73
(xi) Fair F.O.R. price excluding cost of stowing		34·65

The incidence of the excess of stowing expenses over the reimbursement was Re. 0·32 per tonne. But it has to be stated that the comparative low incidence is due to the fact that of the total production only a small proportion necessitated stowing.

21·8. Price for different grades :

21·8·1. Having arrived at the fair average sales realisations of the various coal producing regions we next have to deal with two more questions (i) what differentials there should be between the various grades, and (ii) whether, to quote one of our terms of reference "in view of the comparative scarcity of higher grades of coal in the country and the imperative need for conserving them and the need for encouraging the wider use of lower grades of coal, there should be bigger differentials than now exist between the

prices of the higher grades of coal, and those of the lower grades". These two questions are closely allied : the first relating to the differentials based on relative valuations of different coals in the past, and the second, to any widening or alteration of these to secure more economic use and better conservation of the scarcer grades and types.

21.8.2. We have dealt with the issue of the inherent value of coal in Chapter 18, and come to the conclusion there that the useful heat value is the scientific, desirable, and at the same time practical method of fixing a price of coal. We have also in Appendix VI given the useful heat values of the average coals of the various grades which are marketed today. We have, therefore, decided that the various grades should be so priced that the average sales realisation for each region should result at what we have settled as fair earlier in this Chapter.

21.8.3. On working out the prices on this basis, we find that the various grades secure prices, which are not only in line with their value as we think they should be, but also obtain differentials greater than at present. At the higher levels, and particularly in the case of coking coals, they settle themselves at a level which secures the objective covered by the second of our terms of reference, quoted earlier. At the lower levels they are unexpectedly, but properly, line with market trends of the last few years. We do not, therefore, consider that any artificial increase of the differentials settled by the useful heat value is called for. We would, however, like to observe that these prices, which we recommend for adoption, significantly alter the pattern of prices of the last few years. This pattern which might have been in tune with reality when the C.P.R.C. reported in 1959 has been continuously eroded by the more or less equal increments in prices given at the various price revisions which have occurred since then principally on account of wage increases. We, therefore, make a few suggestions in this respect.

21.8.4. The weighted average of the prices fixed on useful heat value for the entire quantity of coal produced during 1965/66 in the private sector in the two regions, *viz.*, Bengal/Bihar region and Maharashtra, M.P. & Orissa

region, will, of course, result in the average fair price fixed by us, *viz.*, Rs. 29.77 and Rs. 27.06 per tonne respectively. But compared to the present controlled prices the prices show large increases in certain grades particularly coking grades of coal. In the collieries where the production of coking grades below HH (treated as non-coking coal) are negligible, large amounts will newly accrue in the shape of completely unearned income with these prices. Only a part of this would be justified by the increasing need to go deeper and deeper for coking coal. We propose, therefore, that the excise duty should be increased by Rs. 1.50 per tonne for the coking grades A & B and Re. 1/- for the coking grades C & D to be recovered from the producers. Alternatively, or if it be preferred as administratively more convenient to recover the cess from the buyer, then the recommended prices should be correspondingly reduced. Similarly, the collieries which produce mainly low moisture Grades II, IIIA, IIIB or high moisture grades I, II in the Bengal/Bihar region and grades II and III in the outlying region will not be able to earn adequate return or in some cases even to recover their cost of production. The low moisture grades IIIA, IIIB and high moisture grade II in the Bengal/Bihar region and grades II & III in the outlying region have been recommended for decontrol. However, to afford some relief to the producers of mainly lower grades of coal we propose to raise the ceiling prices of high moisture grade II Bengal/Bihar region to Rs. 25/- per tonne and for grade IIIB to Rs. 24/-. For the Maharashtra, M.P. and Orissa regions where the proportion of production of grades II and III is more than 50% of the entire production, we propose a ceiling price of Rs. 27/- per tonne for grade II and Rs. 26/- per tonne for grade III. The recommended prices are shown in the two statements in Appendix VII.

21.8.5. *Singareni and Assam*.—Since the prices of these two coalfields are based on their own assessed fair costs, in one case of a single unit in the region and in the other, the largest producer, we do not consider any adjustments necessary. However, we recommend the complete decontrol of Singareni coals, and subject to an examination by the Government of India in consultation with the State Government, of Assam coal also.

Chapter 22

FORMULAE FOR REVISION OF PRICES

22.1. The need for a change in prices would arise in the proximate future only on account of a change in wages, or the price of stores. Variations in other elements in the costs could be neglected in the short run.

22.2. With the contingency allowance provided for by us we do not anticipate that any need to revise prices would arise for the next two to three years on account of variations in the prices of stores, normal increments in the wages and salaries, or variations in other overhead items.

22.3. This allowance apart, there would be a cushion arising out of improvement in productivity. From the experience in the past it is seen that the O.M.S. in India has steadily risen by about 0.01 tonne per annum. Since the prices recommended are based on the O.M.S. achieved during the year 1965/66 the price for any subsequent year may be adjusted to an O.M.S. which is higher by 0.01 tonne per annum. In the Bengal/Bihar region the reduction in cost for a rise in O.M.S. 0.01 tonne together with the return on working capital thereon would be about Re. 0.12 per tonne. In the outlying regions the variation would be Re. 0.11 per tonne. This we would expect to be the normal improvement expected of any colliery without special effort or investment but more should be expected of a well-managed colliery. The experience of some well-run collieries to which we make reference in Chapter 23 which follows shows that a faster improvement of productivity is quite practicable.

22.4. However, a change in the variable dearness allowance could not be expected to be covered by the allowance for contingencies and the saving due to improvement of O.M.S. contemplated above. For each slab of increase in the variable dearness allowance the amount of increase in wages is 19 paise or together with P.F. contribution 20.52 paise per man per shift. Therefore, for the Bengal/Bihar

region with an O.M.S. of 0.49, the variation in the costs would be of the order of 41.9 paise per tonne. This will automatically raise the needs of funds for working capital. Together with the return on working capital therefore, the increase in the price would be about 43 paise per tonne. We would expect the producer to absorb increases of costs up to at least the economy due to normal averages improvement of O.M.S. dealt with in para 22.3. The formula for adjusting the price for any change in various dearness allowance above or below the 7th slab, to which level the recommended prices correspond, would be as follow:

For a change of one rupee in the variable dearness allowance the prices could be correspondingly increased or decreased, (subject to the economy due to productivity referred to in para 22.3), as the case may be, by the following amount :

- (a) For Bengal/Bihar region Rs. 2.29 per tonne.
- (b) For Madhya Pradesh region Rs. 2.04 per tonne.

The amounts should be proportionately increased or decreased for the actual change in the variable dearness allowance.

22.5. We have already stated that in our opinion any variation in the cost of stores in the next three years would be covered by the allowance for contingencies provided for, unless there is any extraordinary increase in stores costs. We have examined the question whether a formula could be devised for easily adjusting the prices for variations in the prices of stores. Our examination shows that there is no uniform pattern in the kind of stores consumed by the different units or the quantities. Even such a simple item as consumption of explosives depends on the extent to which the coal is obtained by blasting and the extent to which it is obtained by manual or other methods. Spares required by the different units are not similar. Requirements for timbering also differ from unit to unit and area to area. We are, therefore, unable to devise any formula for adjusting the prices for variations in the costs of stores. It is for this reason that we have decided to cover such possible increases with an allowance for contingencies.

22.6. The most convenient way of dealing with the issue of cost changes, on account of stores or items other than wages, is to conduct a quick cost examination of a few representative units, say every third year, or whenever warranted.

22.7. As regards the effects of the new Wage Board Award, we are of the opinion that it will have to be separately estimated. This we shall do as soon as the orders of Government on the Award are made known to us.



Chapter 23

MECHANISATION OF THE COAL MINING INDUSTRY

23.1. Mechanisation in the coal mines is a relative term since even those mines which rely largely on manual labour have some machinery like fans to circulate fresh air, trolleys and tracks to move coal from the exploited face, and winches and lifts for haulage to the surface. It is the degree of sophistication and the extent of mechanisation that distinguishes a mechanised or semi-mechanised mine from a manually worked one. The coal industry has over the last few years in India, and even more so abroad, shown a marked tendency to replace manual operations with mechanical ones for a variety of reasons, the most important of which are : the need to reduce costs to meet competition from other fuels, and the need to reduce both the occupational hazards of labour underground and the number of men facing these hazards. In U.S.A., labour force in coal mining fell from 4,41,000 in 1948 to 1,34,000 in 1965 while total production increased and output per man shift in the later year went up considerably to 17.67 tonnes against 6.32 tonnes in the earlier year. In Britain, the U.S.S.R. and also Poland considerable strides have been made in mechanisation and output. In Britain, there are manless coal faces mined from the surface with remote control. However, in India, mechanisation has, with half-a-dozen exceptions, only gone to the extent of mechanical recovery at the face and mechanical transport. The main obstacles to a higher degree of mechanisation in India are the social problems which displacement of labour entails, and the difficulty of maintaining machinery, particularly complicated machinery, due to lack of adequately trained staff, workshop and repair facilities, and difficulties in getting spare parts for machinery which is mostly foreign at present.

23.2. *Development of coal mining techniques.*

23.2.1. *Open cast mines.*—The characteristics of machinery vary as between open cast mines and under-ground

mines. Drag lines, power shovels, and scrapers are used for removal of overburden in an open cast mine and subsequently for the winning of coal. The investment in an open-cast mine ranges from Rs. 40 to Rs. 70 per tonne of annual output depending upon the type of equipment and ratio of overburden to coal. The normal equipment is shovels, dumpers, dozers and blast hole drills. In India, out of the total 839 working mines in December 1966, 156 were open cast, and 189 both underground and open cast working. The available figures for 1966 show that about 19 per cent of total coal raised was from open cast, and the rest from underground workings. Of the 345 collieries which had open cast workings, only 16 were mechanised and they were equipped with shovels ranging from 1 to 4.6 cubic meters. The total production of five of these collieries in 1966 was 2.4 million tonnes, and part of this output was recovered manually. There is therefore considerable scope not only for mechanisation of the remaining 329 open cast workings but also for changing to open cast recovery the underground workings of some whose cost of removal of overburden by mechanical means is lower than that of driving shafts or inclines to approach the coal.

23.2.2. Underground mines.—In 1966, there were 958 coal cutting machines in use, and they cut 22.7 million tonnes, or one-third of total output of coal. They were in use in only 232 (or 28%) of the total 839 working mines. The mines with coal cutting machines produced also an additional 20.8 million tonnes of coal manually. As regards mechanical conveyors, only 43 mines were using them and the total coal conveyed was 8 million tonnes, or 11 per cent of total output of coal. Only two mines, one in the public and the other in the private sector, had continuous miners and they had a rated capacity of 300 to 500 tonnes per shift, but owing to difficulties in maintenance, particularly in obtaining spare parts, production was not satisfactory and the full benefits of mechanisation not secured. One of these two mines which produced 155,800 tonnes in 1966 using two continuous miners utilised only 25 per cent of its rated capacity. A few longwall faces have come into operation and a few more are being planned but no data are available.

As regards mechanical loaders, only 40 were in use in only 15 collieries, and the quantity mechanically loaded was 1.3 million tonnes which was less than 2% of total output of coal. The rest of the coal in these 15 collieries was loaded manually. The investment cost per tonne of annual output in a mechanised shallow underground mine may be Rs. 70 to Rs. 80, but this is likely to go up to Rs. 120 per tonne, in the case of deeper mines. A deep mine with heavy capital installations, such as lined shafts, winding equipment, ventilation fans etc. would be economical only for a heavy concentration of output and a great degree of mechanisation. The deepest shafts in Indian coal mines are not much over 2000 ft., whereas they go much deeper in Europe, and only 11.16 per cent of total coal produced in India was conveyed by mechanical means in 1965. While in U.S.A., the output per haulage worker works out to 50-60 tonnes and in Europe to 25 to 35 tonnes, in India it ranges between 3 and 5 tonnes only.

23.2.3. Surface transport.—The following alternative or combination of methods for the surface transport of coal are used in our collieries. In open cast mines :

- (i) Loading with power shovels on to trucks or dumpers which transport it to the dump or bunker and/or
- (ii) Mechanical loading on to conveyor belts which carry coal to the dump or bunker.

In underground mines :

- (i) Underground tubs taken on to the dumping ground or bunker, and/or
- (ii) Conveyor belts carrying coal to the dump or bunker.

23.2.3.1. There are not many places where wagon loading is mechanised on the surface but some modern installations are coming up with one operator controlling the entire operation of wagon spotting and loading on a weigh-bridge. This enables a quick turn round of the wagons

supplied in block rakes. Overhead bunkers with mechanically operated chutes for filling coal in wagons as well as high platforms, from which coal is pushed into the wagons, are both in use. Data are not available of the extent to which these devices are collectively or individually used and the total quantity of coal transported and loaded into wagons thereby as against manual loading.

23.3. *Consequences of mechanisation.*—As a consequence of mechanisation certain changes have been introduced not only in technique but in the principles and procedure of mining. In U.S.A., as well as in Europe, the trend is to work a fewer number of collieries and aim at a higher output. There is a tendency therefore for the reduction in the number of pits or seams worked, closure of marginal pits, and linking several pits with a low capacity with a central pit having a high output. There is also concentration on the working of pit-head services such as sorting and washing plants, workshop, generating and coking plant. Reduction of the roadway network in relation to tonnage produced, limiting working to a single level, elimination of avoidable transfer points, centralisation of haulage and transport of material and adoption of powerful high capacity transport equipment are some of the measures that have been taken in order to derive maximum economies from mechanisation. For the optimum use of the equipment and machines and reduction of overheads, continuous working also needs to be undertaken. In Russia, two shifts are used for recovery of coal and the third for preparation of coal face and maintenance of equipment. These are some methods of improvement to which greater attention will need to be paid in future in India.

23.4. *Comparison of costs of production in mechanised, semi-mechanised and non-mechanised mines.*—In spite of the fact that no less than 34 mines have been reported to be highly mechanised, only partial information was available from 6 mines on the economies of mechanisation. It would appear strange that comparative costs of mechanical and manual recovery of coal are not studied by the mines for management decisions.

23.4.1. The Bankola Collieries have certain workings which are fully mechanised and certain others partially mechanised and they have set out the costs per tonne of coal raised as follows :

Items of cost (excluding other costs)	For fully mechanised mining	For partially mechanised mining
	Rs.	Rs.
Wages	7.50	11.50
Stores	4.00	2.50
Power	1.50	1.00
Depreciation	4.00	2.00
TOTAL	17.00	17.00

In the case of the fully mechanised mines, the coal is cut by arc shearers, drilled, blasted and loaded by mechanical loaders into shuttle cars which deliver the coal on to belt conveyors from which it is mechanically loaded into tubs. At the surface, the coal is stacked, drawn from stock and loaded into wagons mechanically. In the case of partially mechanised mines, the coal is cut by coal cutting machines and the blasted coal is hand loaded into the tubs. The rest of the process remains the same. The output per man shift in the fully mechanised mines is two tonnes and partially mechanised mines 0.75 tonnes.

23.4.2. The Singareni Collieries have given more detailed data in respect of mechanised and conventional mining and one advantage of these data is that they relate

to two parts of the same coal face and are therefore fully comparable. The particulars are as follows :

	For me- chanised mining	For con- ventional mining
Quantity of output (tonnes)	1,94,685	1,88,894
No. of manshifts (Pit stage)	72,975	2,60,014
O.M.S. (pit stage)	2.66	0.72

Cost per tonne (in Rs.)

(a) Wages and salaries	5.53	12.68
(b) Explosives	1.20	1.67
(c) Other stores	2.13	2.16
(d) Labour amenities	0.52	0.52
(e) Power charges	1.11	0.69
(f) Miscellaneous	0.55	0.55
(g) Depreciation & development provision	4.68	1.82
(h) Royalties	1.38	1.38
(i) Interest charges on capital	1.99	0.77
Total Cost	19.09	22.24

23.4.2-1. The Company, however, adds that in the case of machine mining units the cost on stores is likely to increase in the future and the consumption of conveyor belting, rollers and spare parts will also be greater later on. On the other hand, these figures do not allow for the reduction in indirect charges, such as less number of houses for miners, expenses on medical facilities etc. It is expected that the increase in the future expenditure on stores will be offset by the decrease in labour costs, amenities, and fringe benefits.

23.4.3. The Nowrozeabad colliery of Associated Cement Co. has constructed a raised platform on which the R.O.M. coal is stocked. It is loaded into railway wagons by the use of bulldozers and trax cavators through chutes. From the data furnished by the colliery, it is seen that in a month when the despatches were over 30,000 tonnes, the labour and stores cost per tonne was Rs. 0.42; but in a month when the despatches were only about 15,000 tonnes, the cost rose to Rs. 0.75 per tonne. The corresponding cost, by the previous method on despatches of the order of 15,000 tonnes per month, was Rs. 0.59 per tonne, and the variation in loading cost due to variation in despatches was not considerable. On analysing these figures, it becomes evident that the advantages of this method of loading are (1) attainment of higher rates of loading and (2) reduction in cost on high rates of loading. The disadvantage appears to be that if the equipment remains idle due to reduction in the volume of despatches, the loading cost per tonne rises steeply.

23.4.3.1. The following additional information has also been furnished by the Nowrozeabad colliery about the cutting and drilling cost :

Cost of coal per tonne of cutting and drilling by machine (at 85% utilisation)	Cost of coal per tonne of cutting and drilling manually
Rs. 5.50	Rs. 6.39

23.4.4. The Tata Iron & Steel Co. has given some data in respect of the cost per tonne of cutting and loading which are as follows :

	Rs.
Cost of coal cutting by mechanical process .	6.28
Cost of coal cutting by manual process .	7.50
Cost of loading coal by mechanical process	0.27
Cost of loading coal by manual process .	1.44

23.4.5. The National Coal Development Corporation has said in its reply that when it took over State Collieries in October 1956, most of the mines were not mechanised. Production was only of the order of 3 million tonnes per annum. During the Second Plan period, it was set a target of 13.5 million tonnes; and in order to achieve this four-fold increase in production, full mechanisation of new mines was undertaken. All new open cast mines were planned for full mechanisation with modern earth moving machinery, and similar steps were also taken for underground mines. During the Third Plan period, the target was fixed at 30.5 million tonnes of which about 25 per cent was achieved. The National Coal Development Corporation has given broad estimates of the result of mechanisation, on the basis of the average cost for 1965-66, as follows :

	Cost of produc- tion per tonne	O.M.S. in tonnes
<i>Type of mechanisation :</i>		
(1) <i>Open cast mines :</i>		
(a) Both overburden and coal removal by heavy earth moving machinery . . .	Rs. 18.69/27.56	1.96
(b) Overburden removal by machinies and coal manu-ally . . .	Rs. 22.06	0.62
(2) <i>Underground mines :</i>		
(a) Coal won by coal cutter and loaded manually . . .	Rs. 24.27	0.54
(b) Coal won and loaded by machines . . .	Rs. 24.44	0.97

These estimates show a considerable increase in O.M.S., and a significant reduction in the cost of production by mechanisation.

23.4.6. *Conclusion.*—The data we have been able to collect are scanty, and have not been checked by us. But on the available figures it would be clear that the cost of production of coal by mechanical means, *i.e.* mechanical cutting and mechanical transport, is lower than that by

manual cutting after blasting and manual loading into trolley-cars by Rs. 2 to 3 per tonne, and that economy in costs of mechanical loading from a bunker filled by conveyor belting transport would be of the order of Re. 1/- per tonne. These of course are only rough indications. However, it is clear that with full employment of machinery there will be a substantial reduction in per tonne costs and a large increase of O.M.S. and consequently of total production with the same labour force.

23.5. Availability of mining machinery.—

23.5.1. The Mining and Allied Machinery Corporation Ltd. (the M.A.M.C.), Durgapur is the chief unit licensed to manufacture coal mining machinery. In the year 1965-66 it produced machinery of the value of Rs. 2.15 crores, and sold machinery of the value of Rs. 1.27 crores. It expects that the demand during the Fourth Five Year Plan would be Rs. 82.38 crores worth of mining machinery, and is confident that it will be able to meet this demand. Its phased production programme for the future indicating the total value of output and the value of imported raw material and components is detailed as follows :

TABLE 29

Programme for production of coal mining machinery

Year	Program- me* (in tonnes)	Total value (in Rs. crores)	Imported raw mate- rials & compo- nents (in Rs. crores)
1966/67	10,000	5.89	1.077
1967/68	17,600	11.71	1.022
1968/69	26,000	20.68	1.179
1969/70	34,000	26.95	0.864
1970/71	40,500	32.22	0.660
TOTAL	1,28,100	97.45	4.802

*(The numbers of different machines proposed to be manufactured are not given, and the data are in terms of the total weight of the machineries to be produced).

23.5.1.1. The approximate figures of the M.A.M.C. regarding the import content, sale price and corresponding import price of the various items it manufactures are given in Appendix VIII. This shows that not only will foreign components be sparingly used but the prices will be competitive and generally lower than those of the corresponding imported items. Similar information has also been received from a few other units. The M.A.M.C. expects that, in view of this programme of indigenous production of mining machinery, the progress in mechanisation of mines will not suffer any setback on account of lack of availability of machinery. It is, however, necessary to ensure that these programmes are not wishful thinking and that they are carried through according to plan not only in respect of the estimated quantity of production but also in respect of the present price forecast and of maximisation of indigenous content.

23.5.2. Divergent views have been expressed in respect of the availability and prices of mining machinery. The Joint Working Committee has said that the quality of indigenous equipment is generally poorer than that of equivalent or similar imported items and that the prices also are generally higher. On the other hand, the Directorate General of Technical Development has stated that so far there has been no complaint in respect of mining machinery manufactured in India, and offered no view regarding the comparative prices of the indigenously manufactured equipment.

23.5.3. One matter which strikes us, and which needs attention, is that steps should be taken by Government to see that there is no overlapping of items produced by the M.A.M.C. and units in the private sector. To attain the fullest import substitution, the M.A.M.C. with its large resources should, we feel, concentrate on items of machinery not now produced in the country by other manufacturers and avoid, to the extent possible, covering any field which the private sector can look after. This of course would not apply to any item which is produced only by one unit. Another suggestion we wish to make is that a study should be made of spares imported in quantity by all mines taken together and indigenous capacity set up for them. We have had complaints that coordination between manu-

facturers of machinery and mines is inadequate and that there is not even a specific guide or directory of available supplies of spares or capacity to produce spares. This should be remedied.

23.6. Views expressed in respect of mechanisation.—

The Coal Controller has observed that the progress of mechanisation in collieries is slow owing to smallness of holdings, easy availability of labour, and shortage of trained technical personnel to handle various types of machinery. One of the main reasons is the apprehension of labour that any large-scale mechanisation may result in retrenchment and unemployment and similar fear of management that the retrenchment or transfer of labour rendered surplus by mechanisation will be resisted. The Joint Working Committee is of the view that the primary obstacle to mechanisation has been the inability of the coal companies to finance the necessary purchase of machinery out of their own resources due to inadequate returns on their sales of coal. Dependence on imports for mechanisation is a great obstacle and mechanisation would progress satisfactorily only when machines of equivalent standard and design are manufactured locally. Lack of trained operatives and maintenance staff has also restricted mechanisation. Operatives of certain categories are not at all covered by the training courses available in India. Mechanisation is also retarded because of the large number of small and fragmented holdings. Considerable retrenchment compensation has to be paid to workers if they are retrenched. The National Coal Development Corporation has observed that until the railways can improve their operational efficiency in supplying wagons to collieries and demand and offtake improve, mechanisation up to the stage of loading of wagons is not practicable. Owing to the erratic offtake and replacement of wagons at sidings, mechanisation of wagon loading is retarded. A number of collieries have expressed their views on the effects of mechanisation, and it appears from the replies that they are not all in favour of maximum mechanisation due to apprehension of increase of costs due to depreciation and stores which may not be balanced by the reduction in the wage bill considering that retrenchment of labour is difficult to achieve in practice.

23.7. Problems facing mechanisation.—In the course of discussions with the Joint Working Committee it was generally agreed that economies of machine mining are not available at levels of production below 10,000 tonnes per month. It may, therefore, be assumed that due to the capital costs involved, mechanisation cannot be profitable or lead to higher productivity in the case of mines with a production of less than 100,000 tonnes annually. Mines which have a lower production should, therefore, be amalgamated with others or closed down if mechanisation (semi or full) is to be adopted.

23.7.1. It is also necessary to ensure that mining machinery of the requisite type is made available in the country at reasonable cost and that manufacturers will carry reasonable stocks of spare parts.

23.7.2. As stressed by the Joint Working Committee, regularity in the matter of offtake as well as supply of wagons is also essential in order to avoid loss of working time of the machines.

23.7.3. In any scheme of mechanisation reduction of the number of workers is inevitable and the spreading out of this problem is of paramount importance in relation to plans for mechanisation. It was stated before us by representatives of certain collieries in the course of the discussions we had with them that even where mechanisation had been effected they had been unable to retrench the staff for fear of creating labour unrest and law and order situation. The result is that in addition to the considerable outlay on machines and stores they were also burdened with the wage bill of superfluous workers. This is an issue which will have to be faced and improvements carried out with the co-operation of labour if progressive mechanisation is to be encouraged and economy of costs secured. Labour representatives have told us that they do not oppose mechanisation, which they agree is essential for progress, but that it should not be very rapid, and should be introduced in co-operation with labour.

23.8. Conclusions.—It is inevitable that hazardous and arduous human effort should in course of time be replaced by mechanical processes. In the near future, such mecha-

nisation alone will reduce occupational hazards as workings go deeper. Even where the manual process is not hazardous but productivity is low, mechanisation should in the national interest be preferred and resorted to. Notwithstanding the opposition on grounds of unemployment and the difficulty of finding alternate occupation for the labour rendered surplus, it is bound to come in course of time, for even with partial mechanisation output goes up by leaps and bounds and costs generally decrease. Some of these economies will no doubt benefit labour. With expanding production, labour displaced from one mine can be transferred elsewhere if there is a suitable plan and programme. It would therefore not be desirable to stay behind world trends in mining techniques.

23.8.1. Instead, therefore, of a halting and reluctant changeover, with setbacks and wastage of money and effort, it is desirable to bring about an ordered and well-planned changeover to mechanisation. The issues and factors involved need to be considered in all their aspects and resolved for the entire industry, instead of individual units being left to decide for themselves. The first and the most necessary step to be taken is to bring about a closure of the small mines or their amalgamation with others in order to constitute economic units. Open cast mines are most amenable to full mechanisation and a programme should be adopted for the production of adequate mining machinery for such mines at prices not much above imported machinery and of comparable quality.

23.8.2. Replacement of human labour by machinery would necessitate programmes for the rehabilitation and alternative employment of the workers rendered surplus. Increase of the country's requirements of coal may well be expected to find adequate avenues of employment for displaced labour in the coal mining industry itself. We would therefore wish to suggest that it is not sound policy to leave these matters to be tackled by individual units which choose to undertake full or partial mechanisation; for, this will create numerous problems including friction between labour and management, wastage of effort, and inflation of costs of extracting coal. They should be handled by Government or a duly constituted authority.

Chapter 24

HOLDING THE PRICE LINE—COST REDUCTION

24.1. We have been asked to examine whether increases in production costs could not be neutralised by scientifically organising and planning development, modernising and mechanising of mines, and efficient management leading to increased productivity.

24.2. *Scope for absorbing cost increases.*—There are obvious limits in the coal industry to which increase of costs could be absorbed except where the standard of management is of a poor order, since the main ingredient of the variable costs which is labour is regulated by work-loads, piece-work rates and wages, and labour amenities all of which are statutorily fixed. Economies in costs will, therefore, be in the fixed costs and therefore gradual and in any short period of a fractional order. One other difficulty is that most of the mines in the private sector have been developed on the bord and pillar system of working and do not lend themselves easily to the adoption of modern techniques or mechanisation. Nevertheless that there is scope for increase in productivity, is clear from the regular, if small, improvement in the O.M.S. seen over the last quarter of a century. This increase has been of the order of three per cent per annum per man-shift of loaders and miners, and a little over 1½ per cent per annum in respect of all labour. The pattern of costs shown in our chapter on costs shows that cost falls with increase of O.M.S. and that O.M.S. goes up significantly with mechanisation.

24.2.1. In the case of the Singareni Collieries Ltd., where semi-mechanisation has been progressively introduced the O.M.S. has gone up from 0.24 in 1950 to a little over 0.50 in 1965, or 7% per year roughly and in some of its new mines is of the order of 1.50 tonnes. The prices fixed for this group of mines, which are treated as a unit, are based on its own costs of production, and the figures given below

reveal the improvement of its cost figures as compared with the rest of the country, due to its schemes for progressive mechanisation :

TABLE 30

Prices of non-coking coal fixed for Bengal-Bihar and Singareni (Yellandu)

(Rs. per tonne)

Year and type of coal	Bengal/ Bihar	Yellandu Colliery (Singa- reni)	Extra price of Yellandu Coll. over Bengal/ Bihar
1949 — Steam	15.99	25.39	9.40
— Slack	14.94	23.41	8.47
1955 — Steam	16.18	21.16	4.98
— Slack	15.13	18.21	3.08
1960 — Steam	21.59	26.08	4.49
— Slack	20.54	23.13	2.59
1961 — Steam	22.51	27.00	4.49
— Slack	21.46	24.05	2.59
1962 — Steam	24.29	27.30	3.01
— Slack	23.24	24.35	1.11
1966 — Steam	30.68	31.95	1.27
— Slack	29.64	29.01	-0.63

We have no doubt that similar trends could be found in most of the better run collieries in the country. We give the Singareni (Yellandu) figures only because they were readily available.

24.2.2. The Commission is not equipped at present to go into questions of the efficiency of management, equipment and labour and it has only been possible for us to examine cursorily significant points which have come to notice

in the course of our inquiry and the cost examination conducted by us. We have, however, been able to come to some broad conclusions which, by and large, indicate in what way productivity could be increased.

24.3. Productivity and mechanisation.—Productivity is the achievement of a higher output with the same inputs through more efficient organisational and production techniques and/or the progressive mechanisation of operations now being run more expensively with manual labour. The factors involved are many and varied and so inter-linked that it would not be easy to isolate them and say whether increased productivity, when it results, is the result of mechanisation of a process, or technological advances, or organisational changes, or better skill and effort of the workers, or mere improvement of morale and incentive. A combination of many favourable influences, tangible and intangible, such as ingenuity of the technician, cooperation between management and labour, the readiness of both to accept innovations and a feeling of a common purpose and willingness to pull together, can produce economies in costs. Some are long term like application of new techniques, whilst others are short term as labour incentives. Some involve capital investment, and others only the human factor. Largely, however, productivity is a management problem and responsibility, though without the cooperation and interest of labour little can be achieved in practice.

24.3.1. For the immediate future the brightest prospects are offered by a moderate measure of mechanisation as revealed by the figures given earlier of the experience at Singareni. If increase in productivity over the years has been accompanied by increase in costs, and therefore of prices, this is largely because of an increase in the costs of living e.g., of the 30 price increases for non-coking coal since the C.P.R.C. Report all except 4 have been due to increase in the emoluments of labour. These increases have been of an order that could not in our view, have been substantially absorbed with good management alone, though some absorption should not have been impossible. By mechanisation we do not mean the extreme sophistication which obtains in some of our newest mines in which indeed problems have

arisen not only of displaced labour, but as regards skills of operation, maintenance of machinery and availability of spares. Such sophistication has to be cautiously adopted and perhaps is best postponed until such machinery is manufactured in the country. However, adoption of mechanical cutting and drilling and conveyance by belts and in suitable cases loading from bunkers would appear to offer economies to the extent of Rs. 2 to 3 per tonne. Today only 246 out of our 839 mines are equipped with coal cutting machines and only 36 with mechanical conveyors. There is, therefore, a vista of progressive lowering of cost through semi-mechanisation before the industry. We have dealt with this issue more fully in an earlier chapter.

24.4. Productivity and labour welfare and safety.—There have been substantial cost increases from time to time due to safety regulations and welfare requirements. On 13-10-1966 for example all mines were declared gassy in supersession of previous classification of gassy, technically gassy and non-gassy. Under the orders of the Chief Inspector of Mines (now Director General of Mines Safety) all the precautions necessary in a gassy mine now have to be put into effect in all mines on and from 1-4-1967. This calls for the investment of substantial amounts in equipment like cap lamps, special explosives, flame proof equipment and so forth which would cost mines which have so far not been treated as gassy about Rs. 1.60 per tonne. Some orders of the Director General of Mines Safety (D.G.M.S.), as in the case of the requirement that helmets and shoes should be supplied to workers, have added to stores costs without making any real difference to working conditions and practices because of the reluctance of labour to change their traditional methods of work. There have also been difficulties in the matter of supplies. Thus there is always a danger of the orders remaining on paper, enforcement becoming difficult. Breaches of his orders are overlooked sometimes by the D.G.M.S. on practical considerations. Similarly, orders from the Welfare Department sometimes result in expenditure for which there is no significant return, social or otherwise. We have seen creches and pit-head baths put up at substantial cost but not used. With the ban on the

use of female labour underground some of the need for creches might have disappeared.

24.4.1. We have a feeling that the departments concerned, in their anxiety to secure the maximum safety and social amenities of a good order, do not take the practical, psychological or financial aspects sufficiently into consideration. The phased introduction of safety and welfare measures should lead to avoidance of infructuous expenditure. Those responsible for productivity have little say in the matter, and the fact that the responsibility for production and the responsibility for the safety and welfare of labour lie in two different departments has made adjustment of objectives difficult. The Government should consider whether a periodical interchange of personnel responsible for Production and for Safety and Welfare will not lead to a better reconciliation of different points of view, with a healthy effect on prices, production, safety and welfare.

24.5. *Cost consciousness and standard costing.*—Few mines, it seems to us, have a scientific system of check of costs. Like other statements in this chapter we make this with some reservation since our study has been only incidental to our enquiry into prices. However, the inability of most mines, to give us any figures of the relative economies of manual, semi-mechanised and mechanised mining, is very revealing. That only 37 collieries out of over 800 addressed sent us their breakdown of costs and that 44 of the 63 to which we sent a special cost questionnaire made no response whatsoever is, however, sufficient indication that there is no costing system as such in most of our collieries. We know that this lack of a scientific system of check on cost is a general shortcoming of almost all industries in the country. This is not to say that there is no effort to secure economy but that there is no system by which the trends of components of final cost could be watched continuously and corrective effort applied exactly where needed and in the best possible way.

24.5.1. Costs of explosives vary in Bengal/Bihar region from 31 paise per tonne to Rs. 1.89 per tonne, and not all the difference is due to the hardness of the coal, methods

of mining, or to the conditions of the strata. In the outlying areas, the variation is from 42 paise to Rs. 1.02 per tonne. In one mine which we have costed all coal is recovered by blasting, and mechanisation at the coal face consists of the use of a coal cutter alone. However, the Chief Engineer who watches every paise on explosives has evolved a system suited to his conditions of work, and brought down costs progressively to Re. 0.42 per tonne against a general average of Re. 0.75 to 0.90. We feel satisfied that measures of economy like this in respect not only of explosives but of other stores as well can be secured in most collieries.

24.6. *Method of Mining*.—The percentage of extraction of coal in our collieries often goes down to 40 to 50 per cent and the average is perhaps of the order of 55 to 60. In an article on the subject, the Director of the Central Mining Research Station, Dhanbad says, "This aspect of mining has not received the attention that it deserves from various quarters. In some cases it might be possible to bring down cost of mining with increase in percentage of extraction of coal..... The figure of percentage of extraction of coal in Indian mines is very much at the bottom compared to different countries of the world. This loss in extraction is very closely linked with the method of extraction Improved technique and method of extraction will go a long way in increasing productivity and reducing the costs of mining"*. One of the main impediments would appear to be the widespread use of the bord and pillar system which renders mechanisation even of an elementary order difficult and should be progressively replaced with more efficient methods of extraction.

24.6.1. Even with the bord and pillar system, there is a complaint that the efforts of the Director General of Mines Safety to maximise safety has led to the prescription of a large part of the pillars being left intact while retreating, and that safety would not be endangered if more coal than at present is extracted. This aspect may justify a second examination of the technical position.

*Vide, 'New Sketch', 26th Jan. 1965.

24.7. Rationalisation of labour.—One feature of the coal industry which has struck us is the rigid classification of labour into exclusive classes and the conception of 'one man for one job'. The labour representatives we interviewed were willing to admit that there were areas where jobs could be combined though they thought the likely economies are of a marginal order. Their main objection to a change of the present system, which we admit has some force, is that any general direction on the point might lead to unreasonable increase of work-loads and diffusion of responsibility and in some cases victimisation of labour. However, they were agreeable to the idea that there should be continuous discussions between labour and management on the possibilities of reallocating the duties, provided some of the benefits went to labour. The main point made by labour representatives is that this is a matter for individual agreements between the parties concerned in each colliery. We are convinced that not marginal but significant economy is possible if there is some rationalisation of labour, and that this could be done without any retrenchment or loss of emoluments. One mine which we have costed was semi-mechanised in 1958 and the use of coal cutters rendered a large number of coal dressers superfluous. Where previously this class of labour had recovered the coal manually after it was released by blasting, exactly the same labour force is now used to attend to the trifling amount of dressing required. The present arrangement seems to be to use the old strength of dressers unchanged merely to nominally supervise the loading of the coal recovered by the coal cutter and to dress the edges. At a rough guess 80 per cent of the labour force of dressers in this mine would appear to be surplus and the wages which could be saved by employing these dressers elsewhere would reduce costs by an amount of the order of Re. 1/- per tonne.

24.7.1. We have seen similar examples of idle time in the Reports of the Central Mining Research Station (C.M.R.S.)*. These studies made by a Research Institute in connection with occupational hazards may be regarded

*Annual Report of the Central Mining Research Station for 1963-64, pp. 52-53, and for 1964-65 pp. 92-93.

as impartial findings of how workers spend their time underground. It is to be seen that some workers have barely two or three hours of work a day on account of the conception of 'one man one job'. The fault is not always that of labour, but it is clear that productivity could be increased with the cooperation of labour at many points.

24.8. *Organisation and management*.—Significant improvement of productivity could probably be secured through the efforts of management. In the mining industry work has to be phased out not only in such a way that the production at the coal face is the maximum, *but also* in such a manner that it is efficiently and effectively handled by the transport system. The Director, Central Mining Research Station, observes, "In some of our small collieries the introduction of mechanisation to pump out water from the colliery will raise the output and the productivity of the mine in such collieries. It has been noticed that when the miners go down in the pit in the morning and find the coal face is full of water they first have to clear the water and then start extracting coal."* This has also been pointed out to us by representatives of labour who have complained that loading could be increased substantially over the present average of two tubs per day if the turn-round of tubs is organised better. They also stated that proper organisation of different jobs would reduce much idle time and increase production. In a recent investigation carried out by the C.M.R.S. in one of the mines the effective time of loading of coal by the face workers was a little over two hours in a working shift of 8 hours for want of adequate tubs. The Director of the C.M.R.S. observes, "It will be seen that the O.M.S. of the face workers in India could easily be increased to three times the prevailing figure if proper facilities are provided. It is not always the face worker to be blamed; for, in many cases the transport problem is a great hindrance, and in some cases it might be the bottleneck of winding, and in other cases it might be the bottleneck of service arrangement or stacking in the depot. These are some aspects where research could be useful for the mining industry."

* In a paper presented to the Conference on Research & Industry, on 21st December, 1965.

24.9. Amalgamation of mines.—Of the 826 collieries in the year 1965-66, 628 produce less than 10,000 tonnes a month and account for only 26 per cent of the production. Indeed, 257 mines produce less than a 1000 tonnes per month and account for only one per cent of total output. The work of the Colliery Voluntary Amalgamation Committee (set up as a consequence of the Report in 1956 of a Committee under the Chairmanship of late Shri Balwantrai Mehta) has not made much progress. Upto the end of November 1966, it had received 308 proposals of which 66 had been approved, 147 dropped and 95 were still under consideration. There are, no doubt, many practical difficulties; but generally it would appear that amalgamation has not gone fast enough because it is voluntary and small units are reluctant to come together. The Coal Consumers Association of India has made the observation that frequently the objection is from the creditors who are anxious that the identity of their debtors should not be lost, and that in some cases they resist amalgamation because as part of the loan arrangement they have the right to sell the coal which is a valuable source of income.

24.9.1. Such small units can, by and large, only exist on account of natural advantages or of unhealthy practices, and it would appear desirable that the scheme of amalgamation should be proceeded with more vigorously than at present. Apart from other advantages, like reduction of overheads, amalgamation will cheapen coal through the recovery of coal now lost in barriers. Our inquiry into costs shows that as a rule the larger mines have lower costs than the smaller ones. In view of the failure of voluntary amalgamation, we recommend that the Government of India should consider the enactment of legislation to secure compulsory amalgamation.

24.10. Miscellaneous.—There are many other well-known ways in which productivity can be increased like better maintenance of machinery, production incentives to labour, greater check on inventories and the issue of stores and free issue of coal and so forth, which are general to the whole industry.

24.11. *Conclusion.*—There is scope for cost reduction in the industry of a small order through better management, and of a larger order through semi-mechanisation of the recovery of coal. To induce cost consciousness, and a continuous effort to secure economy and increase productivity, which mean the same thing, we suggest that the prices should be kept stable over a fair period, of say, two years, with an annual cost examination of a few representative units. The history of coal prices shows that every increase in cost has been neutralised by an increase in price. This is a disincentive to reduce costs by efforts at improvement of management and operational efficiency. Price increases should be agreed to only when there are significant increases of cost.



Chapter 25

COAL PRICES IN INDIA AND ABROAD

25.1. The price of coal and the cost of energy abroad are strictly not of relevance to our enquiry, but provide an interesting background to our sixth term of reference which covers the impact of price increases on manufacturing industry using coal for energy.

25.2. Coal is not a commodity with an international price. Oil has taken its place as the international fuel and has become a strong competitor with coal because of its notable advantages as a fuel : its quality is dependable, its transport cheap and devoid of transport losses, its storage and recovery are economical, its quality and moisture content unaffected by storage, and the by-products are the hunting ground of the organic chemist. Nevertheless, all energy consuming countries endeavour to protect coal for a variety of reasons, not the least being its strategic importance. For, external sources of supply of energy are liable to interruption even in respect of a country which keeps aloof from international entanglements and embarrassments.

25.3. India is unique in that its coal, is its cheapest source of energy. The following two tables of price by tonne, and by million B.T.U. indicate comparative prices of Indian and foreign coals. The figures are only *very broad* indications since the *qualities* of the coals *are not strictly comparable*.

It is noticeable that coal, thanks to sophisticated mechanisation is almost as cheap in the U.S.A. as in India. Prior to devaluation it appears to have been cheaper.

TABLE 31
Wholesale prices of coal per tonne

	Sweden*		Germany*		Canada*		U.S.A.*		China†		Australia†		U.K.**		India*	
	Kron	Rs.	DM	Rs.	\$	Rs.	\$	Rs.	£	Rs.	£	Rs.	£	Rs.	Rs.	Rs.
1964	.	86.66	127	66.5	126	12.2	94	4.80	40	..	56.00	..	..	..	..	23
1965	.	88.48	130	69.5	132	12.7	94	4.80	40	..	..	..	..	..	..	24
1966	.	90.00	132	69.5	132	12.7	98	4.99	42	2.19	61.54	219	61.56	4.00	83.53	26

Source:—*U.N. Monthly Review of Statistics; January, 1967.

† Figures furnished by MMTC.

** National Coal Board of U.K.

TABLE 32

1966 Prices of coal per million B.T.U.

Country	Calorific value K .cal./ Kg.	Price	Specifications (as available)	Price in rupees per million B.t.u. (all post de- valuation)
1	2	3	4	5
<i>Australia :</i>				
South Coast	7546 (13,600 B.t.u./lb.)	\$9.50 per long ton	Coking : 2' x 0 Moisture : 1.5% Volatiles : 23.5% Fixed carbon : 64.7% Ash : 10.3%	5.23
New Castle Maitland	7220 (13,000 B.t.u./lb.)	\$7.00 per long ton.	Coking : 2' x 0 Moisture : 2.3% Volatiles : 37% Fixed carbon : 57.5% Ash : 8.5%	4.03
<i>England :</i>				
Lancashire	6610 (11,900 B.t.u./lb.)	£5.16.11 long ton	Washed 1/2"	4.60
Scotland	7560 (13,600 B.t.u./lb.)	£6.19.5 per long ton.	Washed Single 1"-1/2"	4.80

Japan :

Imported . . . 14400 (B.t.u./lb.) \$12.35 per long ton.

Moisture : 2%
Ash : 5.5%
Volatiles : 16-19%
Sulphur : 0.8% maximum

2.87

Non-coking-domestic . 6500/7000 (11,700/12,600 lb.) B.t.u./per tonne.

Moisture : 2-3%
Ash : 12-13%
Volatile : 40-45%
Fixed carbon : 40-45%

4.13 to 4.37

India :**Bengal-Bihar :**

R.O.M. Grade A . Over 13,200 (B.t.u./lb.) Rs. 32.20 per tonne Ash not exceeding 13%

1.107

Steam Grade A . Over 13,200 (B.t.u./lb.) Rs. 33.22 per tonne Do.

1.142

Singareni :

Round coal . . 11,500/10,860 (B.t.u./lb.) Rs. 33.64 per tonne Do.

1.327 to 1.406

Outlying Coalfields :

Grade III R.O.M. . . 9450 (B.t.u./lb.) Rs. 26.20 per tonne Ash between 28 to 35%

1.258

One interesting feature is that Japan uses imported coal though 50 per cent more expensive than indigenous coal, and that her steel industry is competitive in the world markets even though all her iron ore is imported at world prices, and her purchase price of coal is nearly three times the price in India.

25.4. Elsewhere in this Report we examine the impact of increases in coal prices on industry in general. But the figures given in this part of our Report show that this country is well placed as regards cost of energy and an increase in the price of coal (which incidentally is cheaper than oil almost all over the country) need not by itself affect the competitive capacity of Indian industry in foreign markets or at home.



Chapter 26

THE IMPACT OF CHANGE IN COAL PRICES

26.1. One of our terms of reference is to consider and report on the impact of price changes that the Commission would recommend on the economy of the country and on the coal consuming industries generally. Neither the time at our disposal nor our resources permit a detailed study of the various direct and indirect effects of our recommended changes in the prices of coal of different grades for different regions. We would, therefore, indicate only the general direction and magnitude of the impact on the costs and prices of important consuming industries and the general price-level in the country on the basis of the results of earlier studies made and also of our limited inquiries and studies in this regard.

26.2. Earlier studies on the impact of coal prices.—

26.2.1. The Coal Prices Revision Committee appointed in 1957 was also made a similar reference by Government regarding the impact of price changes they would recommend on the economy of the country and on industry generally. According to the Committee, as almost all industries use some coal, an increase in the price of coal would have widespread impact on the economy. But they did not consider it necessary to calculate in detail the percentage increases in the costs of production of various coal consuming industries resulting from their recommendations (which meant an increase of Re. 1/- per ton in a price of about Rs. 17/- per ton) because (a) for consuming industries using large amounts of coal like steel, cement and some chemical industries, the percentage increases in their cost of production would be less than one and the effect of an increase in the price of coal on the other consuming industries would be negligible; (b) the transport cost of coal was an element nearly as important as the price of coal itself; and (c) the assurance of supplies and right conditions for the expansion of production of coal were more important to the consumer than the price of coal itself.

26.2.2. The Swaminathan Committee appointed in 1963 also studied this aspect by calculating the average cost of coal consumed as a percentage of ex-factory value of products and by-products for eight important coal consuming industries on the basis of the Census of Indian Manufactures, 1958. They found that these percentages ranged from 0.20 to 7.41 and that a marginal rise in the price of coal could not, therefore, have any serious impact on the production costs of these industries. As regards the Railways, the largest single consumer of coal, they observed : "It is seen from the report of the Railway Board for 1960-61 that their total consumption of coal amounted to 16.10 million tons for that year. The cost of coal consumed as a percentage of gross earnings of the Railways amounted only to 8.5% during that period." As regards electricity, they stated : "The cost of coal as a percentage of the revenue realised from sale of thermal power was in the region of 23% for 1957-58. Since then, the electricity tariff rates have undergone an upward revision and, therefore, the effect of an increase on the profitability of thermal power generation and distribution would not be substantial".

26.2.3. In a study on "The Pricing Policy for Coal Undertakings in India" made in 1964 by the Indian Statistical Institute, the impact of coal prices and also the element of transport cost was estimated by a more scientific linear programming method by using the 1960-61 balance-sheet data on costs of a few selected coal companies and the demand and other data for that year (in one case data of 1959-60). It was estimated that if the average pit-head price of coal increased by 10 per cent the value of its inputs (excluding labour) would increase by a little less than one per cent. Thus, an initial increase in the price of coal by 10 per cent of its prevailing price would provide relief to the coal industry by about nine-tenth of the increase as about one-tenth would be absorbed by an increase in the price of its input which would be increased by an increase in the price of coal. Thus, to provide a net relief of 10 per cent to the coal industry, a rise of 11 per cent in the price of coal would be necessary. The study then worked out the estimates of increase in the prices of other sectors caused by a 11 per cent increase in the price of coal and concluded that

the prices of the major coal consuming sectors were not likely to be significantly affected. The increase in the case of electricity generation and transmission was estimated at only 2.34 per cent, and for iron and steel, railways and communications, cotton textiles, cement and glass, between 0.9 and 0.2 per cent. The average increase in the price level and the general cost of living index was estimated to be 0.28 and 0.10 per cent respectively. It concluded that the price elasticity for coal within the price increase of 10 per cent could be neglected.

26.2.4. In a paper on "the Economics of Fuel and Power" Sinha, Basak, Moitra and Lahiri of the Central Fuel Research Institute* estimated the effects of 10%, 20% and 40% increases over the 1958 cost of energy (fuel and power) per unit on the total unit cost of production of the main product of each of the 29 industries studied by them on the basis of the data in the Census of Indian Manufactures and Public Electricity Supply—All India Statistics, General Review, 1951 and 1958. Though this study deals with the energy costs as a whole and not the coal cost, its findings are worth noting in as much as coal is the most important source of energy in India today. Their conclusion was that even a 40 per cent increase over the 1958 cost of energy per unit would result in an insignificant increase in the percentage costs of energy in the total cost per unit of the main products of the manufacturing industries, the maximum difference of 7.5 per cent being observed in only two of the industries studied. They also found that energy consumption per unit of the main product declined from 1951 to 1958 for almost all industries, while the cost of energy per unit increased.

26.2.5. It may be noted that the earlier studies, based on the Census of Indian Manufactures or balance sheet data, estimated the impact of changes in the price of coal (or energy) including transport cost. They have all come to more or less the same conclusion, namely, that an increase in the price of coal would bring about less and in many cases far less than proportionate increases in the prices of products of the coal consuming industries.

*Vide—Eastern Economist, 5th March, 1965.

26.2.6. According to the Report on Cost of Production of Steel (known as the Mahatab Committee Report) 1966, however, coal cost (excluding transport) constituted 14.6 to 22.2% of the total cost per tonne of ingot and any change in its price would have a substantial impact on the cost of steel.

26.3. *Scope of our study on impact.*—The price changes that we recommend are in respect of F.O.R. colliery prices which have been under statutory control. However, the coal consuming industries not only buy coal but also transport and the cost of the latter makes delivered coal costs much higher than pit-head prices. As the transport cost of coal is beyond our terms of reference, the scope of our study is limited to the impact of changes in the colliery price of coal on the consuming industries.

26.3.1. Though we are concerned only with the pit-head price of coal, it is necessary to note the relative importance of the freight and other charges to the coal consuming industries.

26.3.2. On the basis of the data available in the Annual Survey of Industries 1963, we find that for the three important coal consuming industries, viz., electricity, iron and steel and cement, the average transport and other charges were 30.5%, 42.2% and 51.0% of the total coal costs respectively in 1963. For the electricity undertakings, these were the lowest in West Bengal, (13.9%) and the highest in Gujarat (62.7%), while for iron and steel industry they were 27.8% in West Bengal (lowest again) and 55.2% in Madhya Pradesh (highest). For the cement industry, the lowest percentage of transport and other charges in the cost of coal was as much as 30.5% in Bihar, and the highest was in Madras with 66.2%, while the All-India average was 51%.

26.4. We called for information on the break-down of the total cost per tonne of coal consumed by individual producers in the different industries for the latest period. The break-down into F.O.R. colliery price, transport cost, taxes paid, and other charges incurred per tonne of coal, as furnished by 19 representative producers from three

important industries viz., iron and steel, electricity (thermal) and cement—located in 12 States of India are given in Table 33. This shows that while the F.O.R. colliery price of coal different grades (from Sel. A coking to Grade III non-coking) used by three different industrial consumers varied by only Rs. 7.93 from Rs. 23.53 in Bihar to Rs. 31.46 in Andhra Pradesh, the total cost incurred per tonne of coal of the same grade varied by as much as Rs. 42.32, from 76.35 in Gujarat to Rs. 34.03 in Maharashtra.

TABLE 33

The break-down of consumers' prices of coal in 1966-67

(Rs. per tonne)						
Indus- try/ Com- pany	Grade of coal used	F.O.R. colliery price per tonne	Trans- port charges	Taxes paid	Other charges	Total cost at works
1	2	3	4	5	6	7
I. Iron and Steel :						
A	N.A.	27.17 (69.5)	9.39 (24.5)	2.18 (5.3)	0.30 (6.7)	39.04 (100.0)
B	N.A.	29.21 (74.0)	10.20 (25.8)	.. ..	0.07 (0.02)	39.48 (100.0)
C	Sel. A	29.33 (52.9)	22.62 (40.8)	3.05 (5.4)	0.49 (0.90)	55.49 (100.0)
D	Gr. A	31.17 (54.4)	22.62 (39.5)	3.11 (5.3)	0.49 (0.8)	57.39 (100.0)
II. Electricity Undertakings :						
A	Gr. III	25.12 (40.8)	35.94 (58.0)	0.75 (1.20)	.. ..	61.81 (100.0)
B	Gr. I	25.25 (44.4)	30.74 (53.6)	0.76 (1.3)	0.50 (0.70)	57.25 (100.0)
C	Rough Slack (Singareni)	31.59 (57.7)	22.41 (41.0)	0.63 (1.3)	.. ..	54.63 (100.0)

1	2	3	4	5	6	7
D	Gr. I . . .	24.89 (47.2)	22.72 (43.0)	2.17 (4.1)	3.08 (5.7)	52.86 (100.0)
E	Gr. III . . . (Slack)	25.12 (54.0)	18.94 (40.8)	2.43 (5.2)	.. ..	46.49 (100.0)
F	(Average for all grades used)	27.63 (68.2)	10.78 (26.5)	2.17 (5.3)	.. ..	40.58 (100.0)
G	Gr. I . . .	23.53 (56.6)	14.38 (34.7)	2.64 (6.4)	0.92 (2.3)	41.47 (100.0)
H	Gr. II . . .	26.09 (16.7)	4.50 (13.4)	2.69 (7.8)	0.75 (2.1)	34.03 (100.0)
I	(Singareni) . . .	30.69 (58.7)	19.40 (37.1)	0.92 (1.8)	1.19 (2.4)	52.20 (100.0)
	(Singareni R.O. M.)	31.46 (75.3)	8.95 (21.5)	0.94 (2.2)	0.35 (1.0)	41.70 (100.0)
III. Cement :						
A	Gr. I . . .	25.25 (52.2)	18.38 (40.5)	0.76 (1.6)	1.36 (2.7)	45.75 (100.0)
B	Gr. I (Slack) . . .	28.70 (56.7)	21.32 (41.4)	.. ..	0.96 (1.9)	50.98 (100.0)
C	N.A. . . .	29.45 (44.00)	33.00 (50.00)	2.17 (4.0)	1.40 (2.0)	65.82 (100.0)
D	Singareni . . .	30.50 (45.70)	35.34 (53.20)	.. ..	0.75 (1.10)	66.59 (100.0)
E	N.A. . . .	26.75 (38.80)	37.37 (54.30)	.. ..	4.75 (6.90)	68.87 (100.0)
F	N.A. . . .	25.73 (38.2)	40.06 (59.5)	0.51 (0.8)	1.10 (1.5)	67.40 (100.0)
G	N.A. . . .	25.25 (33.10)	49.36 (64.70)	0.76 (0.9)	0.98 (1.3)	76.35 (100.0)

Note.—Figures in brackets indicate percentage to total cost at works (i.e. Col. No. 7)

26.4.1. The freight element in the final cost of coal for iron and steel industry ranged from 24.5% to 40.8%, for the electricity undertakings from 13.4% to 58.0% and for cement industry from 40.5% to 64.7%.

26.5 *Distribution of impact of changes in coal prices :*

26.5.1. The impact of changes in coal prices on the economy will depend on the quantities of coal currently consumed or planned to be consumed by the industries and households. This impact will be according to the percentage of total production of coal consumed by each. The current as well as the planned future percentage distribution of total output of coal are given in Table 34.

TABLE 34

Current and future patterns of consumption of coal in India

	% of total production coal required in	
	1965—1966	1970—1971
1. Railways	24.2	15.2
2. Iron & Steel	16.6	18.0
3. Electricity	16.4	17.2
4. Coal & Coke	6.7	6.7
5. Cement	4.4	5.0
6. Ceramics, Bricks etc.	2.8	3.1
7. Paper & Paper products	2.5	2.8
8. Cotton Textiles	2.0	1.7
9. Metal Products	1.8	1.7
10. Fertilizers	1.7	7.5
11. China-ware & Pottery	1.5	1.2
12. Misc. Chemicals	1.3	1.7
13. Glass & Glassware	1.0	0.9
14. Vegetable Oils	0.9	0.7
15. Jute Textiles	0.5	0.4
16. Plantations	0.2	0.1
17. Others :		
(a) Total industrial consumption	94.2	93.0
(b) Household consumption	5.4	4.0
(c) Exports	1.9	1.0
(d) Change in stocks	(—)1.5	+2.0
(e) Total production of coal	100.00	100.0

26.5.2. The current distribution of coal consumption shows that industrial consumption forms 94.2% of total coal production, while household consumption is only 5.4%, and exports 1.9%. Consequently, almost the entire impact of changes in coal prices will be on the industrial consumers of coal.

26.5.3. Out of the current 94.2% industrial consumption of coal, as much as 57.2% is distributed among three major consumers—Railways (24.2%), Iron and Steel (16.6%) and Electricity (16.4%). Even in their planned consumption for 1970-71, these three together will still be using slightly over one half of the expanded production of coal (50.6%), though they interchange their positions as the largest consumers—Iron and Steel (18.0%), Electricity (17.2%) and Railways (15.2%). Thus the impact of a change in the prices of coal would be mainly on these three large consumers of coal.

26.5.4. So far as other consuming industries are concerned, only one of them, *viz.*, Coal and Coke industry (6.7%) consumes over 5% of the total output of coal. By 1970-71, two more industries, Fertilizers (7.5%) and Cement (5.0%) are expected to join this group and will have to bear a larger impact of the change in coal prices than industry generally.

26.6. *Percentage of coal costs in the ex-factory prices of products :*

26.6.1. While the total impact of changes in coal prices on these consuming industries will be felt according to the proportion of total output of coal that each industry consumes at present or would consume in the planned future, the individual impact on the prices of products of these industries will be according to the ratio formed by coal costs in the ex-factory price of each product manufactured.

26.6.2. The percentage costs of coal in the ex-factory values of output of industries, as calculated by us by using (a) the ex-colliery prices of coal for 1964-65, based on the data in Draft Fourth Plan, Material and Financial Balances and (b) the total cost of coal for the year 1963, based on the Annual Survey of Industries data available for that year, are given in Tables 35 and 36.

TABLE 35

% of cost of coal (at ex-colliery prices) in the total ex-factory value of output

(Estimated on the basis of data from Draft Fourth Plan Material & Financial Balances)
(1964-65)

Consuming industry	% of coal costs
1. Railways	6.2
2. Iron & Steel	5.1
3. Electricity	13.2
4. Coal & Coke	6.7
5. Cement	7.1
6. Ceramics, Bricks, etc.	3.8
7. Paper & Paper Products	3.6
8. Cotton Textiles	0.6
9. Metal Products	0.6
10. Fertilizers	5.6
11. China-ware & Pottery	6.4
12. Misc. Chemicals	1.9
13. Glass & Glassware	4.7
14. Vegetable Oils	0.2
15. Jute Textiles	0.3
16. Plantations	0.1

TABLE 36

% Cost of coal in the total ex-factory value of products and by-products

(Estimated on the basis of Annual Survey of Industries)

Name of the Industry	Years		
	1961	1962	1963
	%	%	%
1. Jute	0.50	0.65	0.7
2. Cotton Textiles	1.30	1.30	1.2
3. Sugar	0.35	0.26	0.3
4. Paper & Paper board	4.50	6.34	6.4
5. Glass & Glassware . . . . .	..	5.27	5.2
6. Cement	20.01	18.76	18.4
7. Iron & Steel	6.12	6.46	6.9
8. Fertilisers	3.98	2.92	2.6
9. Heavy Chemicals . . . . .	..	3.35	3.0
10. Electricity . . . . .	..	17.02	17.2

26.6.3. The difference that exclusion or inclusion of transport cost would make to the percentage costs of coal in their product prices can be seen from the figures given below for comparable industries, though they refer to two adjacent years and are subject to relative price variations in these years :

TABLE 37
% costs of coal in different industries

	1963*	1964-65**
	%	%
(1) Iron and Steel	6.9	5.1
(2) Electricity	17.2	13.2
(3) Cement	18.4	7.2
(4) Paper and Paper Boards	6.4	3.6
(5) Cotton Textiles	1.2	0.6
(6) Glass and Glassware	5.2	4.7
(7) Chemicals	3.0	1.9
(8) Jute Textiles	0.7	0.3

26.7. Impact on the general price level :

26.7.1. Since coal is consumed by almost all industries in some amount or other, and since the major coal consuming industries like railways, steel plants, thermal power stations and cement are basic to all other industries, it is expected that the impact of a change in the price of coal would be widespread in the economy. But would an increase in the price of coal raise the general price level? This is not likely. "In general, each of the successive secondary effects of a rise in the price of coal—the rise in transport costs, which itself raises the cost of steel, which in turn increases running costs, and so on—will be smaller than its predecessor, so that the final rise in the general level

*Including transport and other incidental costs.

**Excluding transport and other incidental costs.

of costs resulting from an initial increase in the price of coal will not be great unless coal costs are themselves a high proportion of total costs before the change*." Thus, the magnitude of impact of a change in the price of coal on the general price level is likely to be small. In the total production of all industries, coal production forms only 3/4 of one per cent. According to the study of the Indian Statistical Institute a 20 per cent increase in the price of coal will increase the general price level by 0.56% only.

26.7.2. The effect of an increase in the price of coal on the cost of living index would also be negligible. Out of the total production of coal in India only 5.4% is used for domestic consumption. As per the I.S.I. study, a 20 per cent increase in the price of coal will bring about only 0.20% increase in the general cost of living index.

26.8. *Some individual consumers' views on the impact of a 20% increase in the price of coal :*

26.8.1. The Commission called for the views of individual consumers of coal in different industries (and also from their associations) on the impact of a 20 per cent increase in the price of coal on their product prices. The few but representative replies received by us confirm the general conclusion of the earlier studies on impact.

26.8.2. Even a 20 per cent increase in the price of coal would have an insignificant effect on the price of products of producers which require relatively small quantities of coal per unit of output. In the case of sugar, a 20 per cent increase in the price of steam coal will increase the total unit cost of production of sugar by 3 paise per quintal, according to the Indian Sugar Mills Association.

26.8.3. Those whose coal requirement per unit of output is relatively more—like railways, iron and steel, electricity and heavy chemicals—indicated the impact on their prices as follows :

Railways : Cost of coal formed 7% and 6% of the gross earnings of the railways in 1964-65 and 1965-66 respectively. It was 8.5% in 1960-61.

*"Economic Survey of Europe in 1951", p. 166.

Iron and Steel Industry.—“A” : In case of steel, an increase of Rs. 1/- per tonne in the price of coal will increase the price of steel by Rs. 1.80 per tonne of saleable steel.

“B” : A 20% increase in the price of coal will result in a 9% increase in the cost of hot metal produced by them.

“C” : A 20% increase in the price of coal/coke will increase the cost of pig iron by 4.4% and the cost of steel by 3.08%.

Electricity Industry : A 20 per cent increase in the price of coal will increase the cost of electricity produced by them by 10 per cent.

Chemical Industry : A 20 per cent increase in the “fuel cost” will increase the selling price of soda ash by 5 per cent, of caustic soda by 3.1 per cent, of flakes by 10.2 per cent and of vacuum salt by 9.3 per cent.

26.8.4. As we do not know the basis of these calculations, we cannot offer any remarks. So far as the electricity industry is concerned the “fuel surcharge clause” enable it to pass on the entire increase in the cost to the consumer. Other industries may not be able to pass on the whole burden of the increase in the cost of coal as it will depend on a number of factors and market conditions.

26.9. To sum up, our recommended changes in the price of coal are not likely to affect the economy of the country significantly. A ten per cent increase in the pit-head price of coal will affect the costs of production of the Iron and Steel industry by about 0.5 per cent, thermal generation of electricity by about 5 per cent and the cement industry by about 0.75 per cent. The effect on other industries will be less than 0.50 per cent. The major coal consuming industries will, therefore, be affected to some extent but the coal cost is not the major element in their costs. An increase, if any, in cost of coal should encourage further fuel efficiency and cost consciousness and would make it possible for them through higher productivity to absorb at least a part of the increase in costs.

Chapter 27

FUEL ECONOMY

27.1. The most economical use of coal requires choice of the lowest grade that would serve the desired purpose and the use of the least quantity which will give the required result, in most cases the production of heat. Fuel economy is of importance both in the interest of the individual consumer and in the national context. Price policy should encourage such economy. For, when fuel is cheap the individual consumer will prefer better fuel than he really needs, to avoid tackling problems of use or combustion which with inferior grades can be vexatious, or to avoid capital expenditure necessary for erecting boilers and ash conveyance equipment designed for the use of inferior coal. From the wider point of view of the country's expendable energy, fuel resources have to be carefully handled both qualitatively and quantitatively.

27.2 *Report of Colombo Plan Experts.*—The valuable report of the fuel efficiency experts whose services were secured for India under the Colombo Plan in 1961 deserve special study in this connection. Their report says that in 1961, at any rate, there were few enterprises in the country where a saving of less than 25 per cent was not possible and there were many where economy of the order of 50 per cent could have been secured. The shortcomings were not only in respect of older factories working traditional processes with untrained personnel, but even with modern factories where engineers were found to be insufficiently knowledgeable in the principles of good fuel and steam utilisation. They were of the view that probably 10 per cent could be saved immediately through elementary measures like lagging and thermal insulation, recovery of condensate heat, economical loading of heat consuming plant and so forth, which they called "First Aid Measures". In many instances, even instrumentation was inadequate and the ultimate bases of "efficiency" in utilization were blind or rule-of-thumb methods.

27.2.1. They came to the conclusion that this was largely because of the price structure and distribution system of coal. They remark : "The price structure of coal neither reflects its value in the national economy nor offers an incentive to industry to use the poorer qualities in better supply. The spectrum of prices, grade to grade, is not broad enough." Enforced economy in fuel they opined, would promote attitudes leading to cost reductions in other elements of production as well. They continue : "The size of coal despatched from collieries requires deeper consideration. It seems quite illogical that whilst in some fuel consuming plants (e.g. gas producers) fines are screened out and rejected, in others (e.g. water-tube boilers with travelling stokers), coal has to be crushed to make it small enough. There seems to be a case for screening plants at the pithead, so that various classes of consumers can be delivered and immediately usable fuel." They therefore recommended a fuel efficiency service as also a price structure of coal which would reflect its value in the national economy and discourage industry from being prodigal in its use. They observe, "The conviction of the expert is that the spectrum of prices should be opened out so as to induce industry wherever possible to seek the cheaper coals in more plentiful supply."

27.2.2. The grade to grade price increases, they thought were so small as to encourage a clamour for the better grades of coal where they were not always essential, leading to a tendency for good coal in short supply to be burnt to offset inefficiency. This impression we also share.

27.3. *Fuel Efficiency Measures in India.*—The Fuel Efficiency Committee set up by the Coal Council of India has done some valuable work in relation to the allocation by grades and sanctioning of coal to industry. The efficiency department of the Coal Board encourages the translation of these results with suitable coal allocations. Much has thus been done since 1961 through measures like pulverised fuel firing at thermal stations, mechanical stocking in Lancashire boilers and so forth. Nevertheless, in 1965, when a survey was made by K. Higginson, Fuel Efficiency

Adviser to the National Productivity Council at Bombay, he came to the view that there was plenty still to be done to save wastage. His estimates of economies are as given below* :

TABLE 38

Saving in fuel costs with fuel efficiency. (in lakhs of rupees)

Factory product	Present costs	Future costs without full efficiency	Future costs with fuel efficiency
Oils	6.62	8.32	5.79
Textiles	16.20	20.52	15.79
Chemical	1.20	1.54	1.18
Chemical	0.60	0.76	0.46
Textile	3.72	4.71	3.01
Chemical	1.02	1.31	1.05
Engineering	7.00	8.87	7.98
Food etc.	0.55	0.70	0.25
Rubber	4.19	5.30	2.67
Engineering	0.05	0.07	0.06
Engineering	0.70	0.89	0.80
Paint	0.11	0.14	0.12
Rubber	10.80	13.00	12.00

27.4. In dealing with prices of coal and the question of disposal of washery by-products, we have taken this aspect into consideration and endeavoured to encourage the use of the lowest grades of coal which consumers could utilise with suitable price inducement. Price advantages, it should be mentioned, should compensate for the capital investment, not always of a minor order, which the use of poor coal requires and must be secure over a long period. Stability of prices, therefore, is a matter of significance.

*Vide—'Economic Times', 8th October 1965.

Chapter 28

DECONTROL OF COAL

28.1.1. *Our limitations.*—Our specific terms of reference do not cover the issue of control of coal though the preamble requests us to undertake a comprehensive inquiry and to make suitable recommendations. On June 20, 1967 however, Government clarified that the issue of decontrol of coal prices should also be given our attention. Till then we had taken the view that while there was nothing to prevent us from recommending decontrol of prices of some varieties of coal, it was not within our purview to suggest complete decontrol of all grades and types of coal and in all respects. We have, therefore, not gone into this issue in any great depth and would only offer a few observations more with a view to rounding off our examination than to make a recommendation after as full an inquiry as we would have desired.

28.1.2. Meanwhile the Government of India have removed the control over prices of all grades and types of coal and lifted distribution control on non-coking coal. This decision was announced in the Parliament on the 7th July, 1967 and any remarks we may make would perhaps be of little practical value. However, we have thought it desirable to let our report on these issues stand as drafted by us before the Government announcement was made.

28.2. *The aspects of control on coal.*—Coal has been controlled in many of its aspects for many years but prior to 1942 these related wholly to safety of labour and methods of working. In March 1942, during World War II, when rail transport came under strain, coal constituted 40 per cent of the goods traffic on the railways. Priorities for the movement of all goods were found unavoidable and led to the formation of the Railways Priorities Organisation. The shortage of coal and its importance to the war effort led to the appointment of a Controller of Coal Distribution

and Transport Advisory Officer, Price control, however, became necessary soon and was enforced. Both price and distribution have thus been controlled since 1944. By 1959 production had increased and demand for transport lessened. Coals of Grades II and III of Bengal/Bihar were found to be selling at a discount. Hence only ceiling and not minimum prices have been enforced in respect of these grades since 1959. Mining has been controlled in many respects since 1937 under the Coal Mines Safety (Stowing) Act, 1937. Transport is controlled now even in respect of grades which have no controls except a ceiling on price. There has therefore been almost complete control since 1944 on production, distribution, price and transport.

28.2.1. Occasionally views have been expressed on the possibility of decontrol and these have recently gained some currency after cement and some categories of steel were decontrolled in 1966. With the recent complete decontrol of steel, it is argued that when two of the principal users of coal are free to set their prices under market conditions, there is no justification for controlling the prices of coal, one of their chief raw materials. In answer to the relevant question in our questionnaire there was support of decontrol only from some consumers and dealers. At the start of the discussions at the public inquiry, complete decontrol was pressed for only by the representative of the Consumers' Association of India and representatives of some Electricity Boards. At the end of the inquiry, however, the representative of the Joint Working Committee, who had raised the issue casually at our previous informal meetings with that body, stated in reply to a specific question that his committee had also veered round in favour of complete decontrol of all aspects of price, distribution, and transport, and to the retention of only such control as is inherent in schemes for subsidies for stowing and adverse conditions.

28.2.2. The question would appear to revolve at present very largely over the two issues of transport and consumer priorities. Other matters like distribution, subsidy, and maintenance and development of output could be handled

more or less adequately even under a system where there is freedom of choice between buyer and seller, and prices and terms of delivery are mutually negotiable. However, the problems of transport and consumer priorities would have to be carefully examined by the Government before a decision could be taken that it would be in the national interest to allow the economics of coal to be settled completely by market forces.

28.3. *The transport problem.*—The question of transport has been examined in detail by the Coal Transport Study Team of the World Bank Mission which came to the view that the transport of coal would be a major problem for the industry and the railway system for a long time. The only decontrol they visualised in the immediate future was that of non-coking coal Grade I and below, and that too subject to prevention of cross movements, for which they recommended that certain consuming regions would have to be linked up with specific producing areas and the consumers, choice of sources of supply restricted to that extent. Railway transport continues to be difficult despite recent improvement in the transport of goods. There are complaints even now that wagon allotment is neither adequate nor regular. Pit-head stocks in the Bengal/Bihar area at the end of December 1966 were 3.786 million tonnes. The figure for the outlying coal-fields was 1.640 million tonnes. The accumulation of stocks in the Singareni Collieries was over 0.84 million tonnes at the time of our visit to the collieries in March 1967 and at the time we signed this report at 0.91 million tonnes. Some of this accumulation was no doubt due to recent food movements, and in the case of Singareni due to temporary suspension of railway traffic following the law and order problem on the Vishakapatnam-Vijayawada line created by the steel plant agitation of 1966. Wagons are however still short and orders to the tune of 0.434 million tonnes are awaiting wagons. But such difficulties have always been endemic and not on the whole abnormal taking the country as a whole. Also there is always a distinct shortage of wagons during the busy months of September-December. Again for many years the Railways have had continuous difficulties in meeting all offerings of soft coke and brick burning coal.

28.3.1. It seems clear to us therefore that despite the magnificent performance of the railways during the Third Plan, there will still be seasonal and other temporary transport difficulties of a significant character. Some chronic railway bottlenecks are yet to be removed. Shortage of transport is therefore a problem the end of which is not in sight and some measure of control would be needed to see that all priority consumers get their needs, and in a type of coal suited to their needs.

28.4. *The problem of consumer preferences.*—Secondly, the shortage of superior grades of coal, and the downward trend of production of such grades in recent years necessitates consumer priorities in allocations and gradewise restrictions. The report of the Colombo Plan Fuel Efficiency Experts on fuel economy in 1961 revealed that consumers are generally prone to use better coals than they need to avoid operational difficulties and equipment investment problems, even though these if tackled would pay them in the long run. The protected market which the country has enjoyed for some years as a consequence of foreign exchange shortage has led to some flabbiness in this respect. The fuel efficiency experts of the Coal Controller's Organisation also do not appear to have secured adequate discipline in the matter. Any slackening of effort now would therefore lead to a waste of national resources, at a time when coal of the better grades nearer the surface of the earth is getting exhausted. A complete freedom of choice to all consumers, or even to a large proportion, seems inconceivable for the present.

28.4.1. Next, we have no doubt that the encouragement of the use of soft coke to stop the burning of valuable cattle manure and timber has already become a matter of national importance. A national plan for the production and distribution of soft coke is overdue and such a plan will again involve allocations of coal and regulation of transport. This means control.

28.5. *Problem of surplus capacity in the industry.*—Lastly, it has to be considered whether the surplus capacity for the production of coal built up with the World Bank

loan will lead to unhealthy competition between producers and reproduce the chaotic conditions in the industry during 1920-26 and 1930-34. Whether mines which may not be able to face much competition should be kept viable for the present or whether it would be healthy to let them disappear immediately is a thorny question which we have not investigated and have not been called on to investigate. Nor are we in a position to forecast whether decontrol will lead to such increases in the prices of superior non-coking coal and/or coking coal as would raise the cost of production of iron and steel, and cement and add to inflationary pressures in the country.

28.6. *Coal in outlying areas.*—With surplus supply of lower grades of coal the time has probably come to remove control over these grades and to retain a ceiling price only if considered desirable. At present Grades II and III of coal of the Bengal and Bihar region are not subject to control except for a ceiling price and it is well-known that this coal is selling below the ceiling price fixed in the Government notification. There would, therefore, appear to be no reason why Grade II and III coals of the outlying coalfields as well as of Singareni Collieries Co. Ltd. should not be similarly treated.

28.6.1. Some Grade I coal has recently been located and is being mined in the Ramakrishnapuram Colliery of the Singareni Collieries. The question would arise whether this coal should continue under control if decontrol is extended to the rest of the production of this colliery which is the only colliery in this region, namely, Andhra Pradesh. Considering that the total production of the Singareni Collieries is, by and large, sufficient to meet all the needs of the South of the country, save for some higher grades which necessarily have to be transported from Bengal and Bihar, there would appear to be no reason why all the coal produced in the Andhra Pradesh area should not be decontrolled.

28.6.2. The coal of the Assam region raises certain difficulties since a good deal of it is produced on a small scale or more or less cottage industry basis. This is a high cost area which survives because of locational advantages.

Any relaxation of distribution control might conceivably cause distress to many small producers who could not stand competition with the Assam Railway and Trading Company which is the only large and well organised unit in the region. This apart, Assam is an isolated part of the Union and for strategic reasons coal production should, we presume, be maintained at a fair level of production in this area. Before the question of decontrol of Assam coals is considered, it is necessary that the Central and State Governments should confer and take into consideration the various aspects we have touched upon but which we have not been able to go into in any detail.

28.7. *Conclusion.*—We are of the view that there is a good case for the lifting of control over Grades II and III of non-coking coal and of all the production of Singareni Collieries Co. with or without the retention of ceiling prices. We recommend that this be done. As regards superior non-coking coals and coking coals it is in our view desirable to take a decision after the results of the decontrol recommended by us are watched for some time and there is fuller appreciation of the capacity of railway transport to meet demand which is not regulated or controlled.



Chapter 29

WASHERIES

29.1. Beneficiation or washing of coal results in many advantages. It saves costs on transport of the inerts in the coal and increases fuel efficiency in boiler or blast furnaces. Besides, washed coal is consistent in quality and many consumers would prefer slightly inferior coal of consistent quality to one which is better but erratic in respect of the inerts combined in it.

29.1.1. In reviewing the past and present production figures of coals in the country the Coal Washery Committee of 1954 remarked that "While in the last two decades coal production has increased from 18.7 million tonnes to 36 million tonnes the average ash in the coal produced in India has increased from 14 per cent to over 20 per cent *i.e.*, an increase of about 6 per cent." Even on the basis of $1\frac{1}{2}$ times penalty (for decreased efficiency in utilisation) for each one per cent increase in ash this average increase in ash is equivalent to nearly nine per cent extra consumption of coal by the industries, *i.e.*, industries were consuming three million tonnes more than they would if the average ash content remained at 14 per cent. In addition to the extra cost for increased coal consumption this 3 million tonnes of extra coal had to be transported over a long distance locking up over 6,000 wagons. The transport of this unnecessary load had also to be paid for by the consuming industries in addition to the pit-head price of coal. Apart from the obvious saving of transport costs of inerts, washed coal is consistent in the ash content and for many applications consistency in quality is more important than low ash percentage. Practically all Australian coal is washed today, 80 per cent of U.S.A. coal so also over 70 per cent of British coal. Washing Indian coals, however, merely produce high ash and low ash coals because of the intimate mixture of inert matter with the coal, and the rejections may contain as much as 40 to 50 per cent combustible matter. In consequence, washed coal becomes expensive and to reduce its cost a market has to be found for the rejects and by-products.

29.1.2. The development of the coal industry in India has followed more or less the same pattern as in many other countries. In the earlier stages of industrialisation at the beginning of the present century reserves of comparatively high grade coals were worked indiscriminately. The increased demands of industry led to the depletion of high grade coal seams and working of comparatively inferior grade seams with higher ash content had to be resorted to. Indian coals were regarded by some experts (e.g., Dr. Randal) as difficult to wash and this impression persisted for many years. As far back as 1946 when the Tata Iron & Steel Co. Ltd. gave evidence before the Indian Coalfields Committee they pointed out that a good deal of cleaning by hand picking was done by them but inadequacies of such cleaning were becoming increasingly apparent due to the progressive deterioration of the quality of the coal. In some of the mines as much as 25 to 30 per cent of the coal was being rejected by manual picking. As stated already Indian coals are comparatively difficult to wash because of their inherent characteristic of the inert matter. Preliminary investigations on the washing characteristics of Indian coals were carried out by the Tata Iron & Steel Co. Ltd., (1918 to 1940) and at the School of Mines under the aegis of the Fuel Research Committee (1942-1947). These investigations showed that the Indian coals though not amenable to cleaning by simple methods could be washed to yield reasonably clean products by the application of suitable processes. The Tata Iron & Steel Co. Ltd. placed orders for two plants of the heavy media type in 1946. One of these plants came into operation at West Bokaro in April 1951 and the other at Jamadoba in September 1952. The capacity of the Bokaro plant was 135 tonnes per hour and Jamadoba plant 300 tonnes per hour. The

average operational data for both plants as reported by the Coal Washeries Committee 1954 was as follows :

	West Bokaro Washing Plant	Jamadoba Washing Plant
Raw coal ash*	18—22%	20—24%
Capacity per day on 2 shift basis	2,160 tonnes	4,800 tonnes
Present throughput per day	1,200 tonnes	1,000 tonnes
Clean coal and ash	85% at 13%	76% at 15%
Middlings and ash	5% at 28%	12% at 30%
Rejection and ash**	10% at 54%	12% at 50%
Cost per tonne capital and revenue @	Rs. 0.75	Re. 1.00

29.1.3. It will be apparent from the above that the West Bokaro washery was at that time beneficiating coal to an ash percentage of 13 per cent. Presently the ash in the washed coal is reported to be 17 per cent partly due to the deteriorating quality of the input and partly due to the Government directive that coal for steel plants should be washed to an ash content of 17 per cent to conserve reserve of coking coals. Tata's representative informed the Commission during the inquiry that they are planning to wash to 16 per cent ash content.

29.1.4. The capital costs and the washing costs are high in the country and for the present washing can only be contemplated in the case of coking coal with the double object of conserving coking coal through beneficiation to 17 per cent ash content and the preparation of a product of uniform ash content to promote blast furnace efficiency.

*In mine samples leaving out bands. Consequently the raw coal is generally higher in ash than shown.

**Slurry losses included.

@Estimated cost on full capacity is seven annas per tonne in respect of West Bokaro Plant and four annas per tonne in respect of Jamadoba plant.

29.2. Present position of washeries in India.—There are nine washeries in operation today of which four are in the private sector namely, Jamadoba, West Bokaro, Lodna and Nowrozabad. The remaining five are in the public sector namely, Dugda I, Bhojudih, Patherdih, Durgapur (HSL) and Kargali. Of the latter five the first four are owned by Hindustan Steel Ltd., and the last by the National Coal Development Corporation. Three more washeries namely, Dugda II, Kathara and Durgapur (West Bengal) are being set up by Hindustan Steel Ltd., National Coal Development Corporation and the West Bengal Government respectively. Appendix IX shows the input of coal and the estimates of clean coal and middlings output of each of the washeries. Out of the above, the Nowrozabad washery washes only non-coking coal for supplying to the cement companies of the Associated Cement Companies group. The remaining washeries are engaged in washing coking coal for the steel plants.

29.2.1. Out of the above the following six are two-product washeries producing only clean coal and middlings :

- (1) Jamadoba
- (2) West Bokaro
- (3) Lodna
- (4) Nowrozabad (clean coal and rejects)
- (5) Kargali
- (6) Bhojudih (middlings-cum-rejects)

The following three are three-product washeries producing clean coal, middlings and rejects :

- (1) Durgapur
- (2) Dugda
- (3) Patherdih.

The rejects at Dugda and Patherdih are small being 1215 tonnes and 7528 tonnes respectively against a production of clean coal in 1965-66 of 1,096,155 and 398,990 tonnes respectively. The rejects at Durgapur were slightly higher being 70,970 tonnes in 1965 against a washed coal output of 805,774 tonnes.

29.2.2. An interesting point about the supply of raw coal of these nine washeries is that all the private sector washeries and the Kargali washery of the National Coal Development Corporation obtain coal from their own collieries, while the remaining four washeries of Hindustan Steel Ltd. purchase their coal from outside parties. Thus while the private sector collieries have no problems or complaints regarding the ash content of the raw coals which they mine themselves, there are serious complaints from the washeries of Hindustan Steel Ltd., about the ash content in the coal purchased by them which is said to be two or three grades lower than the invoiced grade which is paid for.

29.2.3. All the washeries have good facilities for sampling and testing the quality of the input coal and also the clean coal and middlings. They maintain an ash content of 17 per cent with a small tolerance of ± 0.5 per cent.

29.3. *Linking of washeries to power plants.*—It is obvious that the economies of the washed coal are closely tied up with the disposal of the by-products which contain valuable energy producing material. The Energy Survey Committee of India observed that in planning electricity generation one important consideration would be the use of surplus middlings from coal washeries as also of inferior coals with high ash content which it would be uneconomic to transport over long distances. The Committee, therefore, suggested that thermal stations should be located near pit-heads to relieve strain on transport and save transport costs and also a link up of washeries with power plants to utilise the by-products. Washeries are at present linked up with power plants to arrange for smooth flow of by-products from one to the other. The Appendix X shows the system of link-up.

29.3.1. From the replies to our questionnaire it is seen that none of the washeries have any difficulty at present in the disposal of their products except Bhojudih washery of Hindustan Steel Limited. The combined product of middlings and rejects obtained by it has no suitable market because its ash content varies from 42 to 45 per cent. It is expected that when the thermal power station at Santal-dih is installed by the West Bengal State Electricity Board during 1970-71 a market will be created for these middlings.

No firm commitment has yet been entered into between the West Bengal State Electricity Board and the Bhojudih washery and meanwhile the combined product of middlings and rejects is being dumped in the washery yard undisposed and affecting economics of the washery.

29.3.2. Though immediately there is no problem involved in the matter of disposal of washery by-products, the position is not likely to remain so for long. On the basis of the first estimates of demand for coal during the Fourth Five Year Plan of 106 million tonnes including 33 million tonnes of coking coal the surpluses of middlings from the washeries from the year 1967-68 to 1970-71 are estimated to be as follows :

1967—68	0.81 million tonnes
1968—69	2.04 „ „
1969—70	1.22 „ „
1970—71	1.16 „ „

29.3.3. Considering that the estimates of demand for coking coal have now been scaled down from 33 million tonnes to about 27 million tonnes the surpluses should be somewhat smaller than the above. The Energy Survey Committee forecasts that between 1975-76 and 1980-81, the problem would be increasingly serious. A good deal would depend upon the rate at which the economy grows and the production of steel progresses. The Committee has estimated the unused quantity of middlings and by-products as also of unused slack non-coking coal on the basis of a five per cent, six per cent and seven per cent growth of national income. It has estimated that the surplus may thus be of the order of 8.7 to 15.2 million tonnes in 1980-81. It has therefore recommended that (i) in planning of electricity generation, by-product coals should be treated as practically available at zero cost when calculating the relative advantages of hydel or thermal generation, and also (ii) to utilise these surpluses and lower grades of non-coking coal markets must be created in the domestic sector through briquetting, coke making, gasification or otherwise. For this purpose it has suggested that the Central Fuel Research Institute should be asked as a matter of urgency to study and report on these problems.

29.4. *Pricing system.*—The current prices of washed coal and middlings are all negotiated. The scope for negotiation is however small because there is no freedom regarding the source of purchase. The D.V.C., the Hindustan Steel Ltd., and the National Coal Development Corporation have among other things agreed to a pricing formula for supply of middlings to the thermal generating stations. We deal with this formula in a later chapter.

29.4.1. The selling prices for washed coal and middlings as reported by the washeries are as follow :

TABLE 39
Current selling prices of washed coal and middlings

Name of washery	Washed coal (Rs./tonne)	Middlings (Rs./tonne)	By-product (Rs./tonne)
Durgapur	Not indicated (washed coal consumed in own steel plant)	Grade III B R.O.M. price Rs. 20.75 less Rs. 2.00 with ash content 35%.	
Jamadoba	Washed coal transferred to works at cost	Grade III B price Rs. 21.11	
West Bokaro	Rs. 34.00	Rs. 21.11	
Lodna	Rs. 39.09	Rs. 15.93	
Nowrozabad	Debit at the rate of Grade III plus Rs. 7.00 per tonne	No middlings despatched.	
Kargali	Rs. 46.65	Rulling price of Grade III B less Rs. 2.00 per tonne.	
Bhojudih	TISCO Rs. 52.64	Rs. 18.39 (provisional) to Chandrapura.	
Patherdih	IISCO Rs. 56.85	Rs. 16.52 to own steel plants.	

29.5. *Unit versus central washeries.*—An important issue has been raised by the Joint Working Committee of the Collieries Association. This is whether it is in the interests of the country or even of the steel plants that coal should be washed at central washeries receiving supplies from a large number of mines in preference to unit or pit-head washeries situated in the collieries themselves. It will be noticed from Chapter 31 that the costs of washing coal are considerably higher at the central washeries set up by the National Coal Development Corporation and Hindustan Steel Ltd. than those in the private washeries. To some extent this is no doubt due to the lower written down capital of the private washeries and we are unable to assess how far extra costs arise because of the different characteristics of the coal received from diverse sources at the central washeries.

29.5.1. The price of coal when it leaves the washeries is sometimes even double that of the raw coal because of the transport and handling cost involved. Whether this burden is worthwhile just to secure uniform ash content in the washed coal is not a point on which we can offer an opinion. At Kargali for example, we have noticed that a good deal of grade E coking coal is washed and the reason given is that though it could be used without beneficiation if fully up to grade E, it is desirable to wash it to secure a uniform 17 ± 0.5 per cent ash content. This is an issue which we consider that Government might very well re-examine. With the time at our disposal we have not been able to examine it as fully as we would have desired.

29.5.2. A unit washery has the following advantages :

- (a) The costs of transport to the washery, which are frequently high, will be avoided.
- (b) In all washing plants the size of the coal and the cleaning characteristics are major considerations. A washery at a pit-head could be technically designed to suit the production of the coal from the colliery to which it is attached. It is not necessarily true that large plants washing coal from a multiplicity of sources will be more economical

than a smaller plant washing from one or two collieries by whose pit-head it is located. The low washing charges of Lodna and West Bokaro are illustrative that the reverse may well be true.

- (c) Cross movement on the railways can be avoided. The railways for example have had some objection to moving coal from the Kargali washery to the Durgapur steel plant because of such cross movement.
- (d) Unit washeries could wash to the requirement of particular customers because the quantities they handle are smaller.
- (e) Disputes on account of the quality of coal received are avoided if the colliery and the washery belong to the same owner.
- (f) Coal which need not be washed is unlikely to be washed if the washery and colliery belong to the same owner since there will be no inducement to the manager of the washery to maintain a high output by washing coal which need not be washed; and
- (g) Considerable economies in the matter of labour, overhead, administration, siding, bunkers can be effected.

29.5.3. As against these advantages to unit washeries, central washeries have the advantage of (a) high output, (b) evening out of fluctuations in or disturbances of supply from one mine or another and (c) ability to meet the needs of a steel plant in large volume at a regular rate.

29.5.4. The Coal Washeries Committee appointed by the Coal Board in 1953 made the following observations in their unanimous report which was submitted in 1954.

“At present day costs and price structure of coal the minimum economic unit of coal washing plant is 100 tons per hour working 16 hours a day which requires an output of at least 40,000 to 50,000 tons per month. Cleaning of Indian coal in most cases

requires a multiple-type plant and for this type of plant the smallest economic unit is of the order of 250-300 tons per hour and 16 hours per day.

“When the transport requirements and organisational and marketing arrangements are considered, grouping for washing is not feasible even if compulsion is used.

“Group washing is possible on a voluntary basis only when a group of mines are so conveniently situated that transport difficulties are minimum and the mines are under the same ownership.

“The problem can however be tackled by installation of multi-plant and multi-purpose central washeries of large tonnages near the existing marshalling yards or base loading stations.

“Practically all coal produced in India passes through eight or ten major railway marshalling yards where an equal number of coal washeries of sufficient tonnage can be located to treat the major part of the coal produced in the country.”

29.5.5. All these arguments for or against may well be examined by a special committee of experts of the mining and steel industries. Should unit washeries find favour with the Government, either side by side with central washeries or in replacement, a good deal of the transport costs paid on inerts in coal will be saved. This would remove a load off the railways and also reduce the costs to the consumer who really buys not coal but coal plus transport. It would, however, be necessary to find ways and means for generating funds or loans with which unit washeries could be set up by collieries singly or in combination.

Chapter 30

THE PROBLEM OF MIDDLEINGS AND REJECTS

30.1. The demand of the iron and steel industry for specifically coking coals, with an upper limit of about 17 per cent ash content raises a peculiar problem. The ash content of coking coal, of which the country is very short, is about 23 per cent on the average. This ash is deeply interspersed in the coal and not easily separable when the coal is ground fine. When the Indian Coalfields Committee reported in 1945, the washability of Indian coal was considered doubtful. Three of the four washeries in the private sector, and the five in the public sector are intended to meet the demands for washed coking coal of the correct specification. Some washeries are operated on a two product basis and others on three. On a two product basis the by-product will be 40/45 per cent of the coal input, and contain 40 per cent or more of ash. On a three product basis the middlings will constitute 25 per cent of the input with 30 per cent ash content, and 20 per cent of rejects with ash content over 45 per cent. The Energy Survey Committee has opined that the balance of advantage is in a two product system, *provided* there is a market for the middlings, since all the by-products will then be usable. This view was questioned at the Public Inquiry on the ground that coal with 40 per cent ash was most difficult to use in thermal stations and in view of ample supplies of inferior non-coking coal, it is preferable to work on a three product basis, and use the rejects for stowing. The recovery by washing has been estimated at 60 per cent by the Ministry of Steel, Mines and Metals against 55 per cent by the Energy Survey Committee.

30.2. *Availability of washery by-products.*—The future availability of middlings and rejects as estimated on the basis of the figures received from the Ministry of Steel, Mines and Metals is as follows :

TABLE 40

Estimated future availability of middlings and rejects

(in million tonnes)

	1967-68	1968-69	1969-70	1970-71
1. Coal as charged to ovens.	12.54	12.85	14.25	16.72
Less blendable coal	1.37	1.41	1.56	1.88
Less coal of higher grades directly charged . . .	1.20	1.20	1.20	1.20
2. Balance of washed coal	9.97	10.24	11.49	13.64
3. Raw coal required*	16.62	17.07	19.15	22.73
4. Rejects and middlings	6.65	6.83	7.66	9.09

30.2.1. The Energy Survey Committee's estimates of middlings and rejects are based on higher iron and steel targets than those visualised by the Ministry of Steel, Mines and Metals and a lower recovery of 55 per cent of washed coal. They are as follows on the basis of a 7 per cent growth in the economy :

Year	(million tonnes)
1970-71	13.5
1975-76	27.7
1980-81	42.8

*(60% of raw coal is expected to be recovered as washed coal).

On a $8\frac{1}{2}$ per cent and 11 per cent basis the figures would be much higher, but for the immediate future we may assume the lowest figure even though recent trends suggest that it may be an over-estimate.

30.2.2. At present none of the washeries except the Bhojudih washery of Hindustan Steel faces any difficulty in disposal of its by-products. It is expected that the by-products of the Bhojudih washery, which are now lying undisposed, will be consumed by the Santaldih Power Station of the West Bengal Electricity Board which may go into operation in 1970-71. But at present it has no market since the ash content is about 45 per cent. Washery by-products are not only high in ash content, but are also in the form of small size since coal has to be crushed before washing to separate the ash. This coal can only be used in thermal power houses specially designed to consume coal of high ash content of 40 per cent and for brick making. It also has to bear transport costs disproportionate to fuel value due to the low coal content. It needs to be investigated if soft coke for domestic use could be produced from these by-products. Research and development in this respect would be of value. It is clear, however, that it would be a national loss not to utilise these by-products fully, and also that the economics of washeries would be affected by about Rs. 5/- per tonne if these by-products are not put to use.

30.3. *Availability of slack*.—The position is similar as regards the small coal and slack produced in the mining of non-coking coal, which is estimated to be as high as 30 per cent of the mined coal, and is neither usable at present for coke production nor readily taken by consumers.

30.3.1. The Energy Survey Committee has made estimates of the probable absorption in the future of unusable slack of coking coal and the by-products of washeries. These estimates are again on the three hypothetical bases of a 7 per cent, $8\frac{1}{2}$ per cent and 10 per cent annual growth in the economy. On a 7 per cent basis the following is its view of the likely position :

TABLE 41

Estimates of future availability of unused slack and washery by-products

	(in million tonnes)		
	1970-71	1975-76	1980-81
Usable by-products	11.5	24.9	39.9
Slack of coking	15.6	20.2	24.2
Total	27.1	45.1	64.1
Estimated use by thermal plants, cement plants and brick burning .	25.4	38.3	55.4
unused	1.7	6.8	8.7

30.4. *Problem of unused washery products and slack.*—These unused balances will go up if (1) the economy develops faster, (2) washeries on a three product basis shift to a two product basis, and/or (3) the steel plan expands faster than now anticipated. The problem of disposal will, therefore, become difficult after 1970-71 and may be serious from 1980-81 onwards. There is also the important point that most of the accumulations will be at the washeries of the steel plants, and freight charges may render it uneconomic to rail them over any great distance for use.

30.4.1. The importance of the problem is fully recognised. The Planning Commission observes in the Draft Outline of the Fourth Plan : "An important consideration in setting up thermal power stations is the need to use up the surplus middlings from coal washeries, and other inferior coals with high ash content which is uneconomic to transport for use elsewhere." The Energy Survey Committee recommended the linking of washeries with power plants, and the locating of large thermal stations at or near pit-heads and washeries to utilise these products. Some linking has already been done. The Kothagudem 'super-thermal' power station with a first stage of 120 KW now complete and a second stage of 120 KW under erection will consume a million tons of coal of 36.53 ash content. The power

stations at Bokaro, Durgapur (DVC), Durgapur Projects, Bandel, Chandrapura, Patratu, and Santaldih are similarly linked with Kargali, Durgapur, Jamadoba, Durgapur, Dugda/Patherdih, and Gidi/Kathara etc. respectively.

30.4.1.1. Nevertheless, there is likely to be an unused surplus at these washeries estimated at 1.16 million tonnes in 1970-71, which will go up progressively later on.

30.4.1.2. The problem can be met only by incentives to power station operators and soft coke producers to install the necessary equipment to make use of these "wastes". These incentives as mentioned in chapter 32 must be strong enough to justify the capital investment needed, which may be considerable and the price will have to be kept steady over a long period since any uncertainty in this respect would discourage capital investment.

30.4.2. To the consumer it is the delivered cost of middlings and inferior coal that matters. Transport costs, therefore, are also, of importance. Valuable work has been done by the Coal Transport Study Team of the World Bank on this question. The Study Team compared the costs of transporting by-product coal from the washeries to nine power plants in Central India, which would require some four million tons of by-product coal by 1970-71. In all cases the costs to the economy of transporting by-product coal was substantially lower than the estimated cost of mining coal in the outlying coalfields. In one case the margin was Rs. 7 and in the others it ranged from Rs. 13 to Rs. 19 per ton. In other words the cost of railing the by-products would be less than the cost of mining of new coal at their nine power plants. The Energy Survey Committee made minor adjustments to the calculations of the Coal Transport Study Team, and came to the conclusion that at zero cost, by-products would have an advantage of at least Rs. 6.50 per ton up to a distance of 1100 kms. The linked thermal stations which now buy washery by-product at a price of Rs. 2 per tonne below the controlled price of Grade III B coal, have pressed for the implementation of what they regard as the recommendation of the Energy Survey Committee.

31.4.2.1. The Energy Survey Committee, however, was not so forthright, and merely recommended that the "opportunity cost" should be "Zero or approaching zero". These recommendations as summarised by itself are as follows :

"We have examined with care the economic problems of transporting these by-product coals and using them economically. We are satisfied that, if suitably priced, a market can be found for all the by-product coals that are likely to be produced.

"These coking coal by-products are likely, however, to find markets principally in uses which are normally met by non-coking coals. Having regard to the substantial amounts likely to be available, there may be no more than a small additional requirement for, non-coking coals in the next Plan Period. By-product coking coals, if suitably priced and transported in closed-circuit train loads, can meet the requirements for coal for thermal electricity stations and other purposes at points as far as and beyond most of the outlying coalfields that it had been proposed to develop. We suggest that the wisdom of developing in the near future some of these outlying coalfields be re-examined."

30.4.2.2. In other words the Committee recommended a price that would find a market for all the by-products, and the slowing down of developing new mines in outlying coalfields if by-products could be made available cheaper than mined coal, on a comparison of fuel content. This is not the same as supplying free of cost.

30.5. To conclude, it is clear that middlings/by-products of washeries and slack coal will be surplus by 1970-71, and embarrassingly so from, 1980-81 onwards, and suitable markets should be created with price incentives to meet problem. We deal with the price question in a later chapter.

Chapter 31

COSTS OF PRODUCTION OF WASHERIES

31.1. Our Cost Accounts Officer has examined the costs of washed coal at the Lodna and Kargali Washeries for the years ended December, 1965 and March 1966 respectively. Our Senior Cost Accounts Officer visited the Washery of Hindustan Steel Limited at Patherdih and collected the costs of three washeries belonging to this organisation viz., Dugda, Bhojudih and Patherdih for a period of six months ending November 1966. The replies to our cost questionnaire from the collieries showed that West Bokaro had furnished all details required by us for the year ended March 1966. We have, therefore, reliable cost figures for six washeries of which two are in the private sector, one belongs to the National Coal Development Corporation (N.C.D.C.) and the remaining three to Hindustan Steel Ltd. (H.S.L.).

31.2. *Operational details of Washeries.*—The capacities and the systems of washing of the six washeries are as under :

<i>Kargali</i> (N.C.D.C.)	Heavy media bath—Baumjig—Cyclone washing. Capacity—1.9 million tonnes per annum.
<i>Lodna</i> (Turner, Morrison)	Accojig wash box. Capacity—0.48 million tonnes per annum.
<i>Dugda</i> (H.S.L.)	Baumjig and heavy media bath. Capacity—2.4 million tonnes per annum.
<i>Bhojudih</i> (H.S.L.)	Heavy media bath. Baumjig and Cyclone washing. Capacity—2.0 million tonnes per annum.
<i>Patherdih</i> (H.S.L.)	Heavy media bath—Baumjig—Cyclone washing. Capacity—2 million tonnes per annum.
<i>W. Bokaro</i> (TISCO)	Sand bath—Sherwen vibrators and screens—made by Chrysler & Chalmers and G.E.C. of India. Capacity—0.65 million tonnes per annum.

The respective input of raw coal and the production of washed coal middlings and rejects are given in the cost statement given in Table 42. The percentages of capacity utilised are :

Kargali	93%
Lodna	100%
Dugda	67%
Bhojudih	74%
Patherdih	60%
West Bokaro	82%

Table 42 shows the washery cost per tonne excluding the cost of coal and freight. The washed coal produced by the six washeries contains different ash percentage but generally range between 16 and 17. The ash contents are :

Kargali	16.5%
Lodna	16.0%
Dugda	17.2%
Bhojudih	17.0%
Patherdih	17.1%

We do not have the correct figures for West Bokaro but believe it to be round about 16.5%. The ash content of the input for Kargali is not known as the break-up of the coal received for washing is not available. It is, however, noticed that out of the total quantity of about 5.6 lakh tonnes raised at the colliery to which the washery belongs as much as 4.8 lakh tonnes was of grade 'E' coking coal the ash content of which exceeds 16 but does not exceed 17 per cent. It has been explained to us that this coal is washed before being sold for the purpose of removing pickable pieces of shale and to secure a uniform 17% ash product, even though consigning it directly to the steel plants would save some washing transport and handling charges. The input of Lodna colliery consists of 45 per cent in 'F' grade coking coal and 55 per cent of 'G' grade. The average ash content should therefore be of the order of 18 per cent. The input for Dugda contains about 21 per cent ash, of Bhojudih about 22.2 per cent and of Patherdih about 24.2 per cent. West Bokaro uses grade 'A', HH and IIIA, but the proportions used are not available, and the average ash content cannot be determined. The following Table No. 42 shows the element-wise cost per tonne of input for the six washeries.

TABLE 42
The Washery Cost per tonne (excluding cost of Coal and freight), + element-wise.

Name of Washery	Kargali	Lodna	Dugda	Bhojudih	Patherdih	West Bokaro
A. (i) Input of raw coal (Tonnes)	17,72,120	4,82,279	8,09,451	7,35,600	5,97,761	5,33,344
(ii) Washed Coal	12,51,837	3,21,398	6,15,736	6,04,859	4,00,055	3,30,944
(iii) Middlings	2,10,919	1,27,120	1,93,131	..	1,82,410	88,398
(iv) Rejects	3,09,364	33,761	584	1,30,741	15,296	1,14,012
B. Input of raw coal per tonne of washed coal	1.4156	1.5006	1.3146	1.2162	1.4942	1.6116
C. Percentage to input :—						
(a) Washed coal	70.64	66.64	76.07	82.23	66.93	62.05
(b) Middlings	11.90	26.36	23.86	..	30.51	16.57
(c) Rejects	17.46	7.00	0.07	17.77	2.56	21.38
D. Rates realised for middlings per tonne—Rs.	18.80	14.34	18.92	..	15.97	19.54
<i>Cost per tonne :</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
1. Wages	1.21	0.39	0.42	0.40	0.45	0.81
2. Salaries	0.33	0.23	0.42	0.41	0.36	0.18

3. H.O. expenses	.	.	.	0.35	0.04	0.52	0.54	0.56	0.02
4. Stores	.	.	.	0.60	0.40	0.16	0.13	0.09	0.78
5. Electricity	.	.	.	0.39	0.28	0.65	0.68	0.88	0.09
6. Repairs & Maintenance	.	.	.	0.21	..	0.63	0.87	0.82	0.12
7. Depreciation	.	.	.	0.72	0.10	1.71	1.53	2.01	0.21
8. Handling charges	.	.	.	0.02	..	0.05	0.05	0.10	..
9. Marshalling yard	.	.	.	..	..	1.84	0.68	1.52	..
10. Dumping of rejects	.	.	.	..	..	..	0.23	0.04	..
11. Other overheads	.	.	.	0.32	0.41	0.29	0.26	0.22	0.11
Sub-Total	.	.	.	4.15	1.85	6.69	5.78	7.05	2.32
12. Less sundry receipts (excluding mid- dlings credit)	.	.	.	0.25	..	..	..	..	0.23
Net Cost per tonne of Raw Coal	.	.	.	3.90	1.85	6.69	5.78	7.05	2.09
Credit for Middlings per tonne of washed coal	.	.	.	3.17	5.67	5.94	..	7.28	5.22

31.3. It will be seen from the above statement that the total cost of washing varies from Rs. 1.85 per tonne of input to Rs. 7.05 and that there is no pattern or similarity between the various items of costs at the six washeries. The following table shows how dissimilar the figures are :

TABLE 43
Washery cost per tonne

	Washing charges	
	Per tonne of input	Per tonne of washed coal
	Rs.	Rs.
1. Kargali	3.90	5.52
2. Lodna	1.85	2.78
3. Dugda	6.69	8.79
4. Bhojudih	5.78	7.03
5. Patherdih	7.05	10.53
6. West Bokaro	2.09	3.37

31.4. *Cost of washed coal.*—Since washeries are primarily geared to handle a certain quantity of input and the washing charges depend not on the amount of washed coal which is produced but on the quantities of raw coal handled and washed, it is obvious that washing charges should be related to the input for the purpose of judging the efficiency of the washery. If it is desired to find the cost per tonne of washed coal one would just have to multiply the washing charges per tonne of input by the proportion of raw coal to washed coal. This proportion would depend on the average quality of the input and differ from unit to unit. The cost of the input varies with the grades of the coal received for washing and to this has to be added the freight charges which vary with the source of each incoming consignment. Therefore, there cannot be any uniformity in the

price of either input or output nor a norm on the basis of expected efficiency, and for this reason it would not be practicable or fair to have a uniform price for washed coal.

31.4.1. Besides, the production of all the washeries except Kargali and Lodna is almost entirely for the use of steel plants which own them. The washeries of Hindustan Steel Ltd., sell some coal to TISCO and IISCO but these sales are small in volume and will cease in course of time. It is only the National Coal Development Corporation washery at Kargali and the Lodna Colliery which wash coal for sale and if it is desired to fix a price for their products it would not be difficult to arrive at a formula for the purpose. The formula would be based on the following proforma on the basis of, say, the previous six months working :

Formula for fixation of price for washed coal

	Quantity	Average price	Amount
(i) Raw coal
(ii) Freight, Transport & handling			
Less : Credit
(iii) For middlings
(iv) For by-products
Net cost of coal			
Washing charges			
Profit at% on employed capital			
Price of washed coal			

However, the pricing of washed coal of these two washeries may perhaps be best left to negotiation between them and their customers.

31.5. We would like to make a few observations on some matters relating to the operation of the washeries which have come to our notice. There is a significant difference in the employment of workers as shown by the following table :

TABLE 44

	No. of workers	No./million tonnes of capacity
1. Kargali (N.C.D.C.) . . .	1,085	571
2. Lodna (Turner Morrison) . . .	63	131
3. Dugda (H.S.L.) . . .	530	221
4. Bhojudih (H.S.L.) . . .	517	259
5. Patherdih (H.S.L.) . . .	411	206
6. West Bokaro (TISCO) . . .	66	102

The elements of wages and salaries shown in Table No. 44 do not reflect the total effect of the disparity in the numbers given above since the operations are not the same. For example, in the cost of Hindustan Steel Ltd. units the element 'marshalling yard' comprises mainly salaries and wages. However, a considerable number of workers are employed in maintaining the township, schools, dispensary etc. In the cost of Lodna and West Bokaro such workers are perhaps small in number and enter into the costs of the colliery and not the washery. Kargali has a scheme for expansion of capacity from 1.9 million tonnes to 2.7 million tonnes per annum and we do not know if the present complement which is extremely heavy includes employees or trainees for future expansion. Despite all these considerations the disparities in the labour force are great, that of the private sector being the smallest.

31.6. It may be asked why even with a lower labour complement the three units of Hindustan Steel Ltd. show a higher cost of production than even Kargali. The reason appears to be mainly because these units are working well under capacity, the percentages of capacity utilised being Dugda 67 per cent, Bhojudih 74 per cent and Patherdih 60 per cent against Kargali's 93 per cent. With the data

available it is not possible to isolate very accurately the variable expenses from the fixed expenses but on a rough and ready basis taking stores, electricity, handling charges and disposal of rejects as variable and other costs as fixed the future costs of H.S.L. units when working to full capacity would be as follows :

TABLE 45
Fixed and variable costs of H.S.L. Washeries

	Present costs/ tonne of input	Cost/tonne of input at capacity production
	Rs.	Rs.
1. <i>Dugda</i>		
(i) Variable items of cost	0.86	0.86
(ii) Fixed items	5.83	3.93
Total	6.69	4.79
2. <i>Bhojudih</i>		
(i) Variable items of cost	1.09	1.09
(ii) Fixed items	4.69	3.45
Total	5.78	4.54
3. <i>Patherdih</i>		
(i) Variable items of cost	1.11	1.11
(ii) Fixed items	5.94	3.55
Total	7.05	4.66

It would be seen that the washing costs become reasonably uniform round about 4.75 per tonne of input and are comparable with those of Kargali, though much higher than those of Londa or West Bokaro. Whether additional staff will be required when utilisation of capacity is increased is not clear, since there are a number of sanctioned but vacant posts. Nevertheless it is probable that washing costs of the H.S.L. washeries at full capacity will be round about Rs. 4.75 per tonne.

31.7. A comparison of the average values of net fixed assets per tonne of coal (which may account fractionally for higher washing costs of the newer washeries) also reveals great disparities as shown by the following figures :

	Net value of assets/tonne of input	
	For actual input	For capacity input
	Rs.	Rs.
1. Kargali	6.71	6.26
2. Lodna	1.16	1.17
3. Dugda }	41.10 (Average)	26.05 (Average)
Bhojudih }		
Patherdih }		
4. West Bokaro	2.48	2.03

31.7.1. This would be an additional reason for not attempting to fix a uniform price for washed coal. We understand in fact that the new washery at Kathare where a sophisticated system of washing will be used the fixed charges alone will be of the order of Rs. 7 per tonne.

31.8. While the fixing of uniform price or the settlement of a pricing formula is both impracticable and unnecessary in respect of washed coal, the position is not the same in respect of the middlings and by-products. These, for reasons which we give in Chapter 32, will present embarrassing problems of disposal in the not too distant future even though they contain valuable combustible matter. It is desirable to settle a price for these products for a number of reasons. Firstly, they are less attractive to consumers than mined coal and for that reason avenues of use must be encouraged through a suitable price and a measure of compulsion. Secondly, in the long term interests of the fuel resources of the country the Government of India have already taken a decision to link washeries with thermal stations and to see that new thermal stations are designed to use high ash coal. This means that the linked thermal station has no choice of source of supply. The settlement of a fair price would therefore avoid unnecessary arguments on price arising out of the compulsory linking of buyer and seller. We deal with a price system for washery by-products in the next chapter.

Chapter 32

PRICING SYSTEM FOR WASHERIES

32.1. We have given reasons in the previous Chapter why we consider it impracticable and unnecessary to settle a uniform price or a price formula for washed coal. In Chapter 30 we dealt with the nature of the problem of washery products. We deal in this Chapter with the question of a price formula for washery middlings and by-products.

32.2. There were certain negotiations between the representatives of the Damodar Valley Corporation, the National Coal Development Corporation and the Hindustan Steel Ltd. last March on the sale of middlings and and by-products produced by the National Coal Development Corporation and Hindustan Steel Ltd. washeries to the Damodar Valley Corporation (D.V.C.) for its power station at Bokaro. On a matter of definition it was then agreed that washery products with ash content from 28 to 35 per cent should be defined as middlings and products with ash content higher than 35 per cent but below 42 per cent should be defined by-products. We propose to adopt these convenient definitions.

32.3. In fixing a price for middlings and by-products a few considerations are of importance. Middlings and by-products can at present only be used by thermal stations with specially designed boilers and equipment for handling coal and ash. These special designs necessitate significantly higher capital costs, extra costs of handling coal and ash and higher costs of wear and tear of machinery than ordinary thermal stations. These costs obviously have to be compensated to some extent if thermal stations using high ash coal and middlings and rejects are not to be at a disadvantage. Secondly, it is not unlikely that as washing of coal increases to meet the future of needs the steel plants the production of middlings and by-products, together with slack non-coking coal surplus to other requirements will exceed the requirements of thermal stations. Other

avenues of demand like use for brick burning and production of domestic soft coke would therefore have to be encouraged. The prices of middlings and by-products should therefore be such, as on a consideration of the content of useful heat value, will be a little more attractive than coal of the same heat value. Thirdly, as the ash content goes up, so does the transport charge on the useful combustible matter. It is also desirable that any prices fixed should either be constant or be fixed on an understandable and reasonable basis so that the necessary capital investment can be made whether by thermal stations or other entrepreneurs on long term assurance of supplies at fair prices.

32.4. We addressed a number of power stations for information regarding the capital costs involved in altering their equipment so as to handle high ash coal, and their estimates of running costs and depreciation, but no useful data were received. The Madhya Pradesh Electricity Board, however, have given us some figures. The boilers at their Korba 100 MW station were initially designed for 25 per cent ash, and later modified to burn up to 42 per cent ash. Their boilers at Amarkantak station have been designed for 35 per cent ash. Their Korba 200 MW extension station is designed to burn 38.81 per cent ash. So again their Satpura 300 MW station is designed for 45 per cent ash content coal. The Board's estimates of increased costs on capital and generation are as follows :

	Rs. (Per tonne of coal)
(1) Component of increased capital cost	1.77
(2) Component of higher rate interest	0.29
(3) Component of drop in efficiency	1.68
(4) Component of additional excise duty & transport costs	1.20
(5) Component of additional ash handling charges	0.11
Total	<u>5.05</u>

We have not examined these figures with reference to primary data, but do not consider that this is necessary, since all that we require is a broad indication of the additional expenditure involved. For, it is clear that as mining goes deeper and deeper, and competing needs for better qualities of coal arise with the development of the economy, the allocation of inferior coal for thermal power stations will become inevitable.

32.5. We have had two formulae suggested to us in this connection. The Central Water and Power Commission has submitted a proposal which takes into account the useful heat value of the by-product with the prices actually being secured for middlings of the Kargali washery as a base. The formula suggested is as under :

Formulae used for calculating useful heat value

$$\begin{array}{lcl}
 B_u = \text{C.V. of dry substance} = \frac{\text{C.V.} \times 100}{100 - (M + 1.1A)} & \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} & \begin{array}{l} \text{Where 'M' is the} \\ \text{\% of moisture} \\ \text{in coal and 'A'} \\ \text{is the \% of ash} \\ \text{in coal.} \end{array} \\
 A_d = \text{Ash \% in dry coal} = \frac{A \times 100}{100 - M} & & \\
 H_u = \text{Useful heat units} = \frac{(100 - 1.5 A_d) \times B_u}{100} & &
 \end{array}$$

32.5.1. At a tripartite conference between the D.V.C., the N.C.D.C. and H.S.L. a second formula was arrived at which is as under :

Price of Middlings :

“The Price of middlings payable by the D.V.C. ex-washery will be on the basis of the statutory ROM ceiling price for Grade 3-B coal less Rs. 2 as rebate for middlings containing 35% ash.

“For every one per cent of improvement in ash content below 35%, D.V.C. will allow a premium at a rate of 20 paise per tonne for each per cent for a period

of 3 years. This will, however, be given only for middlings upto 28% ash. For any middlings, having less ash i.e., below 28%, the premium will be limited to what may be admissible for middlings having 28% ash. In other words, the premium will be a fixed component while the statutory price may vary from time to time.

“While the base price for 35% ash content middlings may vary depending upon the variation of the ceiling price for Grade 3-B ROM coal, the rate of premium payable for improvement in ash content will continue to be at the same rate of 20 paise for each 1% improvement for a period of three years.

“As regards by-products containing more than 35% ash and not more than 42% ash, it was agreed that this will be converted to equivalent middlings of 35% ash content, on the following formula :

$$\text{Middlings contents} = \frac{\text{Total tonnage of mixture} \times (55 \text{ less percentage of ash content in by-products})}{20}$$

“The quantities of the middlings component thus arrived at will be paid for on the basis of the price of 35% ash content middlings as determined in the previous para”.

32.6. No other formula was suggested to us though at the public inquiry representatives of thermal stations argued that middlings and by-products with very high ash content are really rubbish and that the washeries should be glad to get rid of them at almost any price. Reliance was also sought to be placed on the observation in the Energy Survey Committee Report that these should be available at near zero costs. However, we do not think that it would be correct to treat middlings and by-products as of no economic value considering that they contain combustible material capable of producing considerable heat. The observations in the Energy Survey Committee Report have also been misinterpreted for it was not a recommendation of that Committee that the middlings and by-products should

be given away free. All that the Committee said was that they should be regarded as potentially available at zero costs when calculating the relative advantages of hydro or thermal generation and of replacing mined coal with washery by-products. Its considered recommendation as found in para 487 of its report is that they should be suitably priced so that a market can be found for all the by-products coals that are likely to be produced. The considerations in para 32.3 of this chapter, therefore, are the proper ones to adopt.

32.7. Middlings and by-products are fuel, and as the quality of coal deteriorates with increased exploitation their value to the economy will become even more apparent than now. Even in the U.K. with coal deposits of superior quality the ash content of coal used by thermal stations rose from 13.4 in 1948 to 17.5 in 1961*. To treat them as of no value would be to subsidise Thermal electricity at the expense of the producers of iron and steel. Strictly the balance must be held even between these two interests unless as a matter of State policy one is to be loaded with a burden in favour of the other. It would follow that the price of middlings and by-products should bear a close relationship to the current price of Grade III-B coal which alone thermal stations—other than old ones set up when higher grades were plentiful—would at present be allowed to buy. An allowance for the extra expenditure arising out of the high ash content, and some stability in price to justify capital investment, are the only special considerations that need apply in linking prices of middlings and by-products with those of Grade III-B.

32.8. We have examined the proposal of the Central Water and Power Commission and find that even after allowing for the fact that the price secured by the Kargali Washery bears no close relationship to the price of Grade III-B, the formula produces some anomalies. It gives a higher price to Patherdih and Dugda I products than to that of Lodna even though the ash content is more. Our observations in Chapter 18 are pertinent. We, therefore

*Report of the Select Committee of the U.K. House of Commons on Nationalised Industries, 1963, Vol. I, para 335.

prefer the formula of the tripartite conference referred to in para 32.5.1. earlier. It values the heat content reasonably closer—since our suggested pricing of coal is based on useful heat value—and discounts the ash adequately. We have not been able to arrive at any other price formula or system which would set a better valuation on middlings and by-products.

32.9. The only issue is if a rebate of Rs. 2 below that of Grade III-B, R.O.M. is fair. Our inquiries show that Grade III-B which has only a ceiling price has consistently sold below the ceiling price since 1959, and that recently rebates have varied from Rs. 1.50 to Rs. 3 and sometimes even to Rs. 4. The rebate on the average is probably around Rs. 2 and this may be the reason why the tripartite conference has adopted this figure. We feel, however, that to create a market for middlings and by-products, and to compensate thermal power stations for the extra costs of using high ash coal, the rebate should be higher. We would suggest a rebate of Rs. 3. The extra rupee would increase the costs of washed coal by only about Rs. 0.20 to Rs. 0.30, and of coke by Rs. 0.30 to Rs. 0.45 per tonne. The effect on the costs of iron and steel in which the cost element of coal is about 10% to 14% should, therefore, be insignificant.

32.10. We therefore recommend that the price formula in para 32.5.1 above, save for the replacement of Rs. 3 for Rs. 2 in sub-para of the para be adopted for pricing washery middlings and by-products.

32.11. *Excise duty on washed coal and by-products :*

32.11.1. Excise duty and other cesses, at present Rs. 2.17 per tonne of coal despatched from either a colliery or a washery, are collected from the consignor if the coal is despatched by rail "freight paid" or by means other than by rail and from the consignee if the coal is despatched by rail on "freight to pay" basis. The excise duty is levied under Section 8(1)(a) of the Coal Mines (Conservation and Safety) Act of 1952. Since this results in the duty being paid twice on washery products, the duty paid the second time on washed coal and middlings is refunded to

whoever paid the duty the second time. In all washeries a certain percentage of coal is lost in the process of washing and in the form of rejects. Since the duty paid on the losses and rejects is not refundable the loss of coal and output of rejects increase the cess element in the price of saleable washery products in the ratio of the raw coal to washed coal or washed coal plus middlings output.

32.11.2. Refunds have at present to be claimed from three different bodies namely :

- (1) The Coal Board, Calcutta in respect of the stowing excise @ Rs. 1.65 per tonne,
- (2) Welfare Commissioner, Dhanbad in respect of the welfare cess @Rs. 0.49 per tonne,
- (3) Rescue Stations, Dhanbad in respect of the rescue cess @ Rs. 0.03 per tonne.

(Note: Out of Rs. 2.17 per tonne a sum of Rs. 0.03 per tonne is treated as a collection charge and is not refundable.)

32.11.2.1. A prescribed procedure has to be followed in making claims for refund and if enough funds are not available the claims remain pending. Hindusthan Steel Ltd. has informed us that the present position of their outstanding claims for refund is as follows :

	As on 31-12-65	As on 31-12-66	As on 31-3-67 (Provi- sional)
	(Rs. in millions)		
Coal Board	8.458	9.143	10.471
Coal Mines Welfare Organisation	4.000	5.962	6.357
Rescue cess	0.251	0.357	0.381
	12.709	15.462	17.209

32.11.3. *Objections to collection of duty a second time :*

32.11.3.1. Objections have been raised to the collection of this excise duty for the second time on different grounds. The Central Water and Power Commission which

is concerned with the increase of the price of middlings due of the proportion of excise duty charged to them by the washeries maintains that washery middlings are not liable to levy of excise duty since they are not coal. Even otherwise, the Central Water and Power Commission urge that as a matter of policy washery middlings should be exempt from the levy of excise duty. The term "coal" and "colliery" are not defined anywhere. However, the legal point seems to us to be valid since under Section 8 of the Coal Mines (Conservation and Safety) Act the duty can be collected only on coal raised and despatched from "Collieries". Legally, therefore, the duty could only be collected from the Lodna and the Nowrozabad washeries which are part of the collieries whose coal they wash and despatch, but not from the Kargali washery of the National Coal Development Corporation nor the washeries of the Hindusthan Steel Ltd. The further point of substance made is that the duty gets loaded with the amount paid on losses and rejected which is not refundable. When coal is despatched unwashed but cleaned by hand no duty is leviable on the shale removed from the coal. The same treatment it is argued should apply to rejects.

32.11.3.2. In its memorandum the Hindusthan Steel Ltd. has informed us that even if despatches are made in railway wagons no excise duty is levied on raw coal despatched from N.C.D.C. collieries to their washeries. A procedure, therefore, appears to have been already established for the grant of such an exemption. It could perhaps be extended to all washeries.

32.11.3.3. The matter has also been commented on by the Mahatab Committee as follows :

"8.2. Cess is being collected on raw coal supplied to the washery as well as on the wahsed coal despatched. The same coal is thus subjected to payment of cess twice. To obviate this double payment, we recommend that cess should be charged only on washed coal. It seems that this would require statutory action"

32.11.3.4. Hindusthan Steel Ltd. has suggested that Payment of excise duty should be at one stage either on raw coal from collieries or on washed coal from washeries. To secure this, Hindusthan Steel Ltd., propose that either the Coal Board Manual should be suitably amended or that special exemption should be allowed to H.S.L. washeries. In other words, once excise duty is charged either on raw coal or on washed coal, as the case may be, there should be no second levy.

32.11.4. We thus have two issues for consideration before us :

1. Whether the duty should be levied at more than one point with a refund of subsequent realisations.
2. Whether it is proper that middlings should bear the burden of any duty at all even the proportion of duty paid on the raw coal and passed on by the washery to the ultimate consumer of the middlings.

32.11.4.1. Dealing with the first point one thing is clear. The process of claiming refunds is tedious, involves avoidable expense of collection charges, and locking up of large funds. Two practical solutions are available :

- (a) To exempt coal despatched to washeries from payment of excise duty. This will have the advantage that duty will not have to be paid on coal lost in washing and on unsaleable rejects, which are not coal. The duty will be paid by the washery or the consumer on the despatches from the washery. This should present no problems as far as unit or pit-head washeries are concerned. Since Central washeries obtain coal from several collieries it is just possible there may be scope for fraud. We are unable to assess this possibility but do not think the risks are likely to be serious.
- (b) To levy excise duty on raw coal as at present but exempt washery products from payment of excise duty. This may be more convenient administratively though the incidence of duty on washery

products will be higher to the extent of losses in washing and rejects. Since loadings at a washery are easily distinguished from loadings at a colliery such exemption would save much paper work and the connected expenditure besides the delays involved in securing refunds as at present. It would give much relief to the consumers of washed coal and middlings and by-products.

32.11.4.2. In dealing with the second issue for consideration before us it has to be remembered that the process of washing produces one fraction of coal of high quality, and another which is of very inferior quality. The two fractions sell at widely different prices. *Prima facie* it is unfair that the excise duty paid on the input should be divided on the output in the ratio of weight alone without any regard to the quality or fuel value of the output. This difficulty would not be there if the excise duty is levied only at the washery on the washed coal and not on the middlings. If, however, it continues to be levied on raw coal as at present, it would be fairer if the entire or a greater burden of its incidence is borne by clean coal.

32.11.4.3. The next issue is whether the duty should be waived both on raw coal despatched to washery and on washery products with a view to cheapening washed coal and washery by-products. This payment finally falls on the consumer. It is, to our mind, unnecessary to consider a full concession in this respect since the duty is small and is after all collected for the benefit of the mining industry.

32.11.4.4. We would, therefore, finally recommend :

- (1) that no excise duties be levied on despatches of coal to a washery,
- (2) that duties be charged only on washed coal and not on middlings or rejects.

If there should be any serious administrative difficulty in respect of (1) above, or any scope for fraud, we would recommend in the alternative that no duties be charged on despatches of washery products from a washery.

Chapter 33

SOFT COKE PRICES

33.1. Low temperature carbonization of coal without by-product recovery was started in India in the Jharia coal fields between 1925 and 1935 for the production of smokeless domestic fuel. The process of manufacture is to stack in heaps of 15 to 20 tonnes, quantities of low grade, coal, rejections from higher grades and washery by-products with flues and chimneys. The flues which are equally spaced are first erected with large pieces of raw coal and the spaces between them are filled with pieces of coal of varying dimensions. The stacks vary in size from small heaps to large stacks 25 to 30 ft. at the base and 7 to 8 ft. high. Combustion is started in the flues and the flames are smothered at intervals with slack or dust coal or ash to control the passage of air into the various parts of the stack. The heat liberated causes the ignition of the volatile matter and about 7 to 10 days are required for carbonization after which the stacks are quenched with sprays of water. What is left is a mass of charred coal, half burnt coal and more or less completely carbonized coke. This is graded and marketed as soft coke and used as domestic fuel. The only standard prescribed is that the ash content should not exceed 45 per cent. Soft coke is produced mostly by collieries producing low grades of coal in Bihar, West Bengal and Assam, but not in any other region. The process of manufacture is crude and wasteful since a large proportion of the by-products and the volatiles is either burnt or completely lost to the atmosphere.

33.2. Soft coke has a considerable demand as domestic fuel for its price is lower than that of other commercial sources of energy such as kerosene even in places distant from the coalfields. Weakly coking coals which are not otherwise graded as coking coals as well as coking coals below 'HH', which are classed as non-coking coals are suitable for making soft coke. The proportions in which the various grades of coal are utilised in the manufacture

of soft coke can be estimated from the following figures which relate to the various grades of coal produced in and used for production of soft coke by collieries in West Bengal and Bihar during the last four years.

TABLE 46
Trend of production of soft coke from different grades of coal during 1962-63 to 1965-66
(In Million Tonnes)

Grade of Coal	1962-63		1963-64		1964-65		1965-66	
	Soft Coke produced	% to total	Soft Coke produced	% to total	Soft Coke produced	% to total	Soft Coke produced	% to total
Rejection from higher grade	0.019	0.89	0.026	1.13	0.048	2.15	0.055	2.01
Selected B	..	..	..	..	..	..	..	..
Grade I	0.013	0.61	0.001	0.04	0.006	0.28	0.019	0.71
Grade II	0.416	19.32	0.324	13.89	0.386	17.22	0.436	15.99
Grade III	1.557	72.32	1.798	77.01	1.608	71.61	1.954	71.63
Grade H H	0.146	6.76	0.183	7.85	0.194	8.62	0.259	9.49
Assam Coal	0.002	0.10	0.002	0.08	0.003	0.12	0.005	0.17
Grand Total	2.153	100.00	2.334	100.00	2.245	100.00	2.728	100.00

33.3. Pattern of production and distribution :

Details of production and distribution of soft coke produced in December 1966 which are given below indicate the general pattern of production and distribution.

TABLE 47

Pattern of production and distribution of soft coke

(Tonnes)

States or coalfields	Production	Soft Coke	
		Production	Distribution
		By rail	Other than rail
Assam	189	..	190
West Bengal—Ranigunj	18,781	4,415	14,911
Bihar-Ranigunj	35,378	19,097	15,492
Giridih	4,249	4,249	..
Jharia	178,992	168,565	9,900
Bokaro	14,220	12,703	845
Karanpura	14,978	5,874	8,972
Total	266,787	214,903	50,310

The following table shows the trends in the production of coal and soft coke from 1955 to 1965-66 and also the percentage of total output of coal used in the production of soft coke (the conversion factor adopted being 1 tonne of soft coke = 1.4 tonnes of coal).

TABLE 48

Trend in the production of soft coke

(in '000 tonnes)

Year	Soft coke produced	Total coal produced	% of total output of coal used in the production of soft coke
1955	1,675	38,838	6.0
1956	1,678	40,062	5.9
1957	1,749	44,200	5.5
1958	1,814	46,065	5.5
1959	1,810	47,812	5.3
1960—61	1,754	55,721	4.4
1961—62	1,845	55,228	4.7
1962—63	2,153	63,831	4.7
1963—64	2,334	66,332	4.9
1964—65	2,245	64,379	4.9
1965—66	2,728	70,297	5.4

33.4. In spite of the fact that the overall production of soft coke has generally been increasing from year to year save a few exceptions as in 1959, 1960-61 and 1964-65, this increase has not been proportionate to the increase in the production of coal in the country.

33.5. It is desirable to consider the extent to which soft coke satisfies the total domestic energy requirement of the country and the part it is likely to play in future. Reference has already been to the recommendations of the Energy Survey Committee in the matter of the requirements of domestic energy in Chapter 12. The estimates of the Energy Survey Committee in respect of the consumption of energy

for domestic purpose in terms of millions of tonnes of coal replacement for 1962-63 and also the projected future requirements as in 1970-71 are as follows :

TABLE 49
Consumption of energy for domestic purposes

	1962—63		1970—71	
	Million tonnes of coal replacement	%	Million tonnes of coal replacement	%
<i>Commercial fuel</i>				
Oil products . . .	15.7	9	28.0	12.5
Soft coke . . .	2.6	2	9.2	4.1
Electricity . . .	1.7	1	5.1	2.2
Total . . .	20.0	12	42.3	18.8
<i>Non-commercial fuel</i>				
Firewood/Charcoal . . .	96.8	57	115.7	51.4
Dung cakes . . .	22.0	13	24.0	10.7
Waste products . . .	29.6	18	43.0	19.1
Total . . .	148.4	88	182.7	81.2
Grant Total . . .	168.4	100	225.0	100

33.6. It would be observed that most of the energy consumed and its estimated requirement in future in terms of coal replacement comes from firewood and agricultural waste. In urban areas soft coke, oil products and electricity are used to a certain extent for domestic fuel. The total contribution of soft coke to the total energy requirement for domestic purposes is however very small. While it constituted only two per cent of the total energy consumed in 1962-63, its share is expected to go up to 4.1 per cent only in 1970-71.

33.7. There is still a very big gap between demand and supply. Owing to lack of facilities of transport the demand has not been fully developed nor even the partially developed

demand been met adequately. From the extent to which cowdung, agricultural waste products and wood-fuel could be replaced by soft coke, it is obvious that production of soft coke could be increased many fold if adequate transport facilities could be made available. It would be sound policy to encourage the use of soft coke, and discourage the use of firewood and dung cakes.

33.8. It would be observed that soft coke is at present manufactured only in Bengal and Bihar coalfields and to a negligible extent in Assam. Coal with weakly coking properties could be converted into soft coke in the coalfields of other States too, and it would be desirable to exploit the possibilities of producing soft coke in the States of Andhra Pradesh, Orissa, Madhya Pradesh and Rajasthan also. It has been suggested by the Joint Working Committee that the transport cost of soft coke should be neutralised with concessional freight rates, and further that it may be distributed at subsidised rates for the burden of subsidy would be more than offset by the saving in the import of fertilizers and the additional production of food grains. Improvement in the transport facilities for soft coke, greater regional availability of soft coke by the utilisation of low grade coals in outlying collieries, and rationalisation of freight rates in order to bring about a partial equalisation of prices all over the country are matters which need the attention of Government as much in the interest of the utilisation of low grade coals which have no other use as of the conservation of organic manure and timber.

33.9. By-products of coal produced in the process of coking such as, tars, naphtha, phenols, pitch, creosote, ammonia, benzol, benzene, toluene, xylene, and coke oven gases are lost in the process of coking of soft coke owing to the primitive methods used. Plans have been under consideration for some time for the setting up of low temperature carbonisation plants. The Singareni Collieries Co. Ltd., is thinking of setting up such a plant in the Fourth Plan, with a carbonization capacity of 900 tonnes per day at an estimated capital cost of Rs. 15.5 crores. The Central Fuel Research Institute has designed a simplified plant for the production of soft coke but its commercial economics

have not yet been worked out. Much progress has not yet been made in the matter of realisation of the by-products and the economics of the cost of production allowing for the value of the by-products has not been fully investigated. Unless the increased cost of sophisticated carbonization can be more or less met by the value of by-products it is doubtful if soft coke can withstand competition from other non-commercial sources of energy.

33.10. The Soft Coke Producers' Collieries Association have complained of irregular and erratic supply of wagons. The Government of Bihar has suggested that restrictions on the movement of soft coke should be removed, priority should be accorded to effect regular movement and piecemeal movement should be permitted for consumers at wayside stations. The Director of Industries, Gujarat State, has stated that coke price should be equated throughout the country, so that coke may replace the demand for kerosene as well as conserve cow-dung. The Joint Working Committee has suggested that high priority should be accorded to the movement of soft coke, that the cess realised from the consumers should be utilised for the propagation of the use of soft coke in rural areas, that Railways should arrange piecemeal movement in four-wheelers, that restrictions on the directional movement should be minimised, and capacity of depots and pilots adequately increased, that soft coke should have a preferential rate of freight and that facilities for transshipment points should be augmented. It has further suggested that State Governments should remove restrictions on the distribution of soft coke, exempt it from sales tax, issue licences to depot holders liberally and extend credit facilities to rural areas for the purchase and consumption of soft coke. Similar recommendations were also made by the Coal Advisory Council. All this needs the attention of Government. We have not had the time for a study of these suggestions.

33.11. *Pricing of soft coke.*—Control on soft coke was started in 1944 when price was fixed on an *ad hoc* basis at Rs. 19/- per tonne. This price has been revised from time to time as a consequence of the revision of prices of coal. The latest price notified on 1st April 1967 is Rs. 36.29

per tonne. Of the 87 collieries which sent replies to the questionnaire issued by us only two units gave us particulars of cost of production and marketing cost of soft coke. In one of these, 21,360 tonnes of coal produced 14,449 tonnes of soft coke and in the other 1,310 tonnes of coal produced 872 tonnes of soft coke in 1965-66. Percentages of the requirement of coal as against the production of soft coke worked out on these figures come to 147.8 and 150.2 per cent respectively. The figures furnished by the Joint Working Committee give the percentage of 1,439 for one unit of soft coke. In the supplementary report of the Coal Price Revision Committee, the ratio has been given as 1 : 1.33. This is the ratio in well designed B.P. coke ovens, and cannot apply to the crude methods now in use. At the discussions held with the various interests it was stressed that the proportion of 1 : 1.33 cannot apply to soft coke produced through crude combustion since there is considerable wastage and that coal to the extent of about one and a half times the quantity of coke produced is normally used. Considering the figures of the two collieries mentioned above and also those of the overall production for one month furnished by the Joint Working Committee, we are of the view that the ratio of 1 : 1.40 is not an overestimate and may be adopted.

33.11.1. Of the units selected for costing only six produced soft coke and that too not on a very large scale. One of these units produced only 329 tonnes during the period adopted for costing and another 700 tonnes only. These were therefore omitted from the scope of investigation. Since soft coke making forms a very minor activity of the collieries and does not involve any significant supervision, an attempt to segregate a proportion of the overheads on the manufacture of soft coke has not been made. A notional amount has however been added towards fringe benefits including provident fund, office expenses etc.

33.11.2. The cost of conversion per tonne of soft coke manufactured by the individual units Nos. 1 to 4 as worked out by the Cost Accounts staff is as follows :

TABLE 50
Cost of soft coke

Particulars	(in tonnes)				
	Unit No. 1	Unit No. 2	Unit No. 3	Unit No. 4	Weighted average
1. Coal consumed	12,000	8,652	14,920	21,313	
2. Soft coke produced	8,000	5,768	9,946	14,209	
3. Input of coal	1.5	1.5	1.5	1.5	
Rs. per tonne of soft coke					
<i>Costs directly chargeable :</i>					
1. Wages	1.16	1.70	1.23	1.35	1.33
2. Other expenses	0.01	0.04	..	0.36	0.15
Total	1.17	1.74	1.23	1.71	1.48

The figure of coal consumed is not based on any accounts, since none have maintained by the costed units, and is an estimate worked backwards from the soft coke produced on the basis of an assumed input output ratio of 1.5 : 1. Working on these figures and adding the cost of wagon loading together with overheads and fringe benefits the figures work out to the following :

	Rs./tonne
1. (a) Direct wages	1.33
(b) Wagon loading	1.27
	2.60
2. Overheads & fringe benefits	1.07
3. Other expenses	0.15
Total	3.82

The simple average would be about Rs. 3.80.

33.11.3. The actual grade of coal utilised by the units were grades E and H (slack) in respect of Unit No. 1, Grade II steam for unit No. 2, Grade III A slack and Grade II steam for unit No. 3, Grade II steam for unit No. 4. Ordinarily Grade III B coal would be used for making soft coke. On this basis the cost of making one tonne of soft coke at the recommended price of coal would be as under :

	Rs./tonne
(i) 1.40 tonnes of Grade III B steam coal @Rs. 24.40	34.16
(ii) Conversion cost as per para 33.11.2 including return on working capital .	3.96
	<hr/> 38.12

33.11.4. The price of Grade IIIB coal has been taken at the ceiling rates recommended by us. For the collieries raising other grades of coal also, the ceiling prices of Grade IIIB will provide more than normal profit. Currently Grade IIIB coal is selling at a discount of Rs. 2/- per tonne and it is likely that in future also the collieries may not realise the full ceiling rate recommended by us. We consider, therefore, that the f.o.r. ceiling price for soft coke could be fixed at Rs. 38/- per tonne. Suitable adjustments may be made in this price as the ceiling price of Grade III B goes upwards or downwards according to the formula, viz., for an increase or decrease of Re. 1/- per tonne in the ceiling price of Grade III B coal, the ceiling price of soft coke should be increased or decreased by Rs. 1.40 per tonne.

Chapter 34

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

34. Our main conclusions and recommendations may be summarised as under :

I Features of the Industry

34.1. At present the steel indury, the electricity industry, and the railwys together take up nearly 60% of the country's production of coal. A large potential demand exists in the domestic sector and if this demand is exploited, it would revolutionise the industry, and be of lasting benefit to agriculture and forestry.

(Paragraph 5.9.)

II Assistance to the Industry

34.2 We would suggest that (i) cesses for stowing and adverse conditions be treated as one head and (ii) all collections should be credited as and when made to the Coal Board for the use of subsidies which it considers earned without the need for securing grants from time to time under separate heads from the Consolidated Fund.

(Paragraph 7.5.1.2.)

34.3. The question of treating Bhaladih as a contractor to the extent that it does not service Equitable's own collieries has been raised by the firm with the Coal Board and is at present pending a decision. We suggest the decision should take note of the fact that sand stowing by the Equitable Coal Co. for other firms is not an activity to be treated as part of its own coal raising activity.

(Paragraph 7.5.2.1.2.)

34.4. We would recommend that in the case of all subsidies the objective should be to meet genuinely and economically incurred costs in full. Our suggested prices and pricing system are based on the anticipation that this will be done, and that all subsidies will be realistic.

(Paragraph 7.6.)

III *Transport of Coal*

34.5. We recommend that till unit washeries are set up by the principal mines, better coal should be allocated to long distance users than to those nearer the collieries, subject, of course, to the coal being technically suited to the consumer.

(Paragraph 9.3.)

IV *Demand for Coal*

34.6. The likely demand for coal during 1970/71 is adopted at 95/100 million tonnes, of which roughly 26.5 million would be coking and 3 million blendable. This would include about 1 to 2 million tonnes for export. Of the 70 million tonnes of non-coking coal about 8.50 million would be required in Selected Grade coals and 30.50 million tonnes in Grade I. The demand for 1975/76 is adopted at 125 million tonnes.

(Paragraph 11.2.4.)

34.7 Considering that the industry was geared to the production of 100 million tonnes of coal for 1965-66, and as many as 225 mines, have secured equipment and spares under the World Bank Loan, the production of 100 million tonnes would not on the whole need any special effort. Some incentive in the form of a higher differential for the production of the Selected Grades is called for.

(Paragraph 11.5.)

34.8. While there should be no serious difficulty in reaching the target for coking coal for 1970/71, the position for later years is at present insecure.

(Paragraph 11.5.2.)

34.9. While all industrial needs of coal are being met there is a large unestimated demand for soft-coke for domestic use and of slack for brick burning.

(Paragraph 11.6.)

34.10. We feel that the additional production in the private sector of the order of 3 million tonnes of coking coal by 1970/71, and 6 million tonnes by 1975/76, and 25 million tonnes of coking and non-coking coal in both the public and the private sectors by 1975/76 would have to be encouraged. These figures are subject to revision after the Fourth Plan is finalised.

(Paragraph 11.7.)

V Domestic Sector

34.11 It is necessary to concert long term measures to meet the needs of domestic fuel in a more rational way.

(Paragraph 12.2.)

34.12. All possible encouragement should be given to existing policies regarding low temperature carbonising plants and for the production and distribution of soft coke and briquettes of lignite.

(Paragraph 12.3.)

34.13. There are promising avenues of conservation of coal which require investigation.

(Paragraph 14.4.1.)

VI Conservation of Coking Coal

34.14. The technical advisers of the Government may examine the practice of washing coal of 17 per cent ash content at the Kargali washery which appears to us as of doubtful benefit, since the price of the washed product is double that of the raw input.

(Paragraph 14.7)

34.15. The coking properties of Assam coal are said to be good, and the adverse factor of 4 to 8 per cent sulphur could be reduced to permissible limits if suitable proportions of this coal and of Bengal/Bihar coal are adopted.

(Paragraph 14.8.)

34.16. Action to conserve our limited supplies of coking coal is needed on the following lines :

- (1) A price inducement for maximum extraction from the seams.
- (2) Subsidies for deep mining.
- (3) Some compensation for restrictions, if and when they are placed deliberately, on the quantity allowed to be extracted by each mine.
- (4) A price which will enforce economy in use.
- (5) Blast furnace efficiency.

(Paragraph 14.9.)

34.17. We are of the view that price incentives provided by a more suitable price structure will encourage increased production, careful removal of shale, and supervised loading of wagons.

(Paragraph 14.10.)

VII A Fuel Policy

34.18. Steps should be taken to formulate a fuel policy since no single Ministry is concerned with the matter of energy which is now handled in four different departments.

(Paragraph 15.2.)

34.19. Should the target of coal over the next Five Year Plan assumed by us at 125 million tonnes change significantly, price structure recommended by us may need reconsideration.

(Paragraph 15.5.)

VIII Finance Position of Industry

34.20. The total capital needed for the expansion to 125 million tonnes by the end of 1975/76 would be of the order of Rs. 125 crores. The additional capital to be invested by the private sector would be of the order of Rs. 12 corers per year and this would clearly be beyond its means.

(Paragraph 16.3.2.)

34.21. Since the immediate need is for the increase of production only of coking coal—capacity for non-coking coal being adequate over the current Plan—a cess of Rs. 0.50 to raise these funds may meet the Fourth Plan needs.

(Paragraph 16.5.1.)

IX Pricing System

34.22. We are of the view that the price structure for coal under present conditions in the country will be based either on average or on marginal costs, and that the basis adopted by the Coal Price Revision Committee still continues to be, by and large, sound.

(Paragraph 17.5.)

34.23. We have come to the view that the broken down costs of the units whose O.M.B. is around the national average of private sector units, with some adjustments would be fair to adopt as norms for the price structure.

(Paragraph 17.5.1.)

34.24. We consider that prices should not be changed for a period of at least two years at a time, and that these instead of being *ad hoc* should be based on a quick cost examination of a few units before the end of this period.

(Paragraph 17.6.1.)

34.25. The best time to introduce any price change would be some time after the passing of the budget of the Government of India, so as to allow for fiscal measures which might effect the producing or the consuming industries.

(Paragraph 17.6.2.)

X Grading, Specification and Testing

34.26. The full exploitation of Singareni Grade I coal is of some importance since it would reduce the fuel costs of the cement factories of South India which now get their supplies from Bengal/Bihar.

(Paragraph 18.1.1.)

34.27. We are of the view that with a view to guaranteeing quality, the I.S.I. standards for joint sampling of coal should be enforced as soon as practicable. Till this is done, a greater check on quality should be secured by more frequent tests by the Coal Controller, whose staff should be strengthened for the purpose. Whenever the quality loaded by a colliery from any seam goes up or down consistently it should be re-graded speedily. This will ensure better preparation of coal and better supervision at the time of loading.

(Paragraph 18.4.6.)

34.28. We suggest that ash be penalised at 1.5 per cent of its weight.

(Paragraph 18.5.1)

34.29. The price structures which now obtain in this country for coal give advantages to some areas which are in the nature of economic rent and could only be got rid of, if at all possible or desirable, under a scheme of nationalisation. To overlook historical price differences will seriously upset the economic of many mines.

(Paragraph 18.5.2.)

34.30. Necessary investigations should be made and arrangements set up for sampling of coal either at despatch or delivery point as the investigations may show to be the convenient. Till then the arrangements suggested in para 18.4.6 would be necessary.

(Paragraph 18.4.7.)

34.31. The fixation of prices of existing grades on the basis of useful heat units shown in Appendix VI is scientific practical and desirable. We have decided to adopt these in our price recommendation.

(Paragraph 18.5.3.)

34.32. Some increase in prices, of coking coals will be in the long term interests of the industry and the consumer since coking coal has to be won increasingly from greater depths and in more difficult mining conditions.

(Paragraph 18.5.3.2.)

34.33. For the future we consider that the grades should be in slabs of useful heat value arrived at on a convenient basis. This would be best done in the case of Bengal-Bihar non-coking coals by having slabs of 300 k. Cal per kg. which retain the number of grades at six. In the case of the outlying coalfields the slabs could be 500 k. Cal, since this coal is inferior compared to that of Bengal-Bihar, and would result in four grades as at present.

(Paragraph 18.6.)

34.34. The grades of coking coal A to G could well be reduced to three with differences of 2 per cent. grades A, B, and C, grades D and E, grades F and G being combined, with ash percentages of under 13 and up to and including 15, over 15 up to and including 17 and over 17 up to and including 19 or in terms of useful heat values, slabs of 300 K. Cal per Kg. The next two grades could be ash percentage over 19 up to and including 21 and over 21 and upto and including 24 per cent.

(Paragraph 18.6.1.)

34.35. We have come to the conclusion that the pre-wetting of a samples is scientifically sound, and commercially desirable, and in settling the price structure we have taken this aspect fully into consideration.

(Paragraph 19.4.)

XI Costs of Production and Future Prices

34.36. The cost structure as evolved by us is exclusive of royalty and any brokerage or commission on sales or despatches.

(Paragraph 20.1.5.)

34.37. We have adjusted the costs of all the costed and non-costed units to the variable dearness allowance payable at the seventh slab i.e., at the rate of Rs. 1.33 per manshift.

(Paragraph 20.1.6.)

XII Suggested Price Structure

34.38. We recommend that the Coal Board should examine the question of extra expenses incurred for gassiness and revise the scales of subsidy suitably if it be found that the present scales of subsidies are inadequate.

(Paragraph 21.2.)

34.39. We recommend that the Coal Board should review the methods of subsidy for stowing and evolve a system of reimbursement which is realistic, and encourage stowing where desirable in the national interest.

(Paragraph 21.7.4.)

34.40. We do not, consider that any artificial increase of the differentials settled by the useful heat value is called for.

(Paragraph 21.8.3.)

34.41. We propose that the excise duty should be increased by Rs. 1.50 per tonne for the coking grades A & B, and Re. 1 for the coking grades C and D to be recovered from the producers. Alternatively, or if it be preferred as administratively more convenient to recover this additional cess from the buyer, then the recommended prices should be correspondingly reduced.

(Paragraph 21.8.4.)

34.42. To afford some relief to the producers of mainly lower grades of coal we propose to raise the ceiling prices of high moisture grade II Bengal/Bihar region to Rs. 25 per tonne and for grade III B to Rs. 24. For the Maharashtra, M.P. and Orissa regions where the proportion of production of grades II and III is more than 50% of the entire production, we propose a ceiling price of Rs. 27 per tonne for grade II and Rs. 26 per tonne for grade III.

(Paragraph 21.8.4.)

34.43. We recommend the complete decontrol of Singareni coals, and subject to an examination by the Government of India in consultation which the State Government, of Assam Coal also.

(Paragraph 21.8.5.)

34.44. We would expect the producer to absorb increases of costs upto at least the economy due to normal average improvement of O.M.S. dealt with in paragraph 22.3. The formula for adjusting the price for any change in variable dearness allowance above or below the 7th slab to which level the recommended prices correspond, would be as indicated in paragraph 22.4.

(Paragraph 22.4.)

34.45. As regards the effects of the new Wage Board Award, we are of the opinion that it will have to be separately estimated. This we shall do as soon as the orders of Government on the Award are made known to us.

(Paragraph 22.7.)

XIII *Mechanisation*

34.46. There is considerable scope not only for mechanisation of open cast workings but also for changing to open cast recovery the underground workings of some whose cost of removal of overburden by mechanical means is lower than that of driving shafts or inclines to approach on the coal.

(Paragraph 23.2.1.)

34.47. The advantages of mechanical loading are (1) attainment of higher rates of loading and (2) reduction in cost on higher rates of loading. The disadvantage appears to be that if the equipment remains idle due to reduction in the volume of despatches the loading cost per tonne rises steeply.

(Paragraph 23.4.3.)

34.48. On the available figures it would be clear that the cost of production of coal by mechanical means *i.e.*, mechanical cutting and mechanical transport is lower than that by manual cutting after blasting and manual loading into trolleys by Rs. 2 to 3 per tonne, and that economy in costs of mechanical loading from a bunker filled by conveyor belting transport would be of the order of Re. 1. per tonne.

(Paragraph 23.4.6)

34.49. Steps should be taken by Government to see that there are no overlapping items of machinery and equipment produced by the Mining and Allied Machinery Corporation and the private sector.

(Paragraph 23.5.3.)

34.50. A study should be made of spares imported in quantity by all mines taken together and indigenous capacity set up for them. The complaints that coordination between manufacturers of machinery and mines is inadequate, and that there is not even a specific guide or directory of available supplies of spares or capacity to produce spares should be remedied.

(Paragraph 23.5.3.)

34.51. Mechanisation cannot be profitable or lead to higher productivity in the case of mines with a production of less than 100,000 tonnes annually. Mines which have a lower production should, therefore, be amalgamated with others or closed down if mechanisation (semi or full) is to be adopted.

(Paragraph 23.7.)

34.52. It is necessary to ensure that mining machinery of the requisite type is made available in the country at reasonable cost and that manufacturers carry reasonable stocks of spare parts.

(Paragraph 23.7.1.)

34.53. Instead of a halting and reluctant changeover, with setbacks and wastage of money and effort, it is desirable to bring about an ordered and well planned changeover to mechanisation. The first and the most necessary step to be taken is to bring about a closure of small mines or their amalgamation with others in order to constitute economic units. Open cast mines are most amenable to full mechanisation and a programme should be adopted for the production of adequate mining machinery for such mines at prices not much above that of imported machinery and of comparable quality.

(Paragraph 23.8.1.)

34.54. It is not a sound policy to leave problems of mechanisation to be tackled by individual units but they should be handled by Government or a duly constituted authority.

(Paragraph 23.8.2.)

XIV Holding the price line

34.55. All increases in prices have been of an order that could not, in our view, have been substantially absorbed with good management alone, though some absorption should not have been impossible.

(Paragraph 24.3.1.)

34.56. The fact that responsibility for production and responsibility for safety and welfare of labour lie in two different departments has made adjustment of objectives difficult.

(Paragraph 24.4.1.)

34.57. The complaint that the efforts of the Director General of Mines Safety to maximise safety has led to the prescription of a large part of the pillars being left intact while retreating and that safety would not be endangered if more coal than at present is extracted may justify a second examination of the technical position.

(Paragraph 24.6.1.)

34.58. We are convinced that not marginal but significant economy is possible if there is some rationalisation of labour.

(Paragraph 24.7.)

34.59. Our inquiry into costs shows that as a rule the larger mines have lower costs than the smaller ones. In view of the failure of voluntary amalgamation, we recommend that the Government of India should consider the enactment of legislation to secure compulsory amalgamation.

(Paragraph 24.9.1.)

34.60 There is scope for cost reduction in the industry of a small order through better management, and of a larger order through semi-mechanisation of the recovery of coal.

(Paragraph 24.11.)

XV Impact of Price change

34.61. Our recommended changes in the price of coal are not likely to affect the economy of the country significantly. A ten per cent increase in the pit-head price of coal will affect the costs of production of the iron and steel industry by about 0.5 per cent, thermal generation of electricity by about 5 per cent and the cement industry by about 0.75 per cent. The effect on other industries will be less than 0.50 per cent.

(Paragraph 26.9.)

XVI Fuel Economy

34.62. We share the impression of the Colombo Plan Experts that the grade to grade price increases were so small as to encourage a clamour for the better grades of coal where they were not always essential leading to a tendency for good coal in short supply to be burnt to offset inefficiency.

(Paragraph 27.2.2.)

XVII Decontrol of Coal

34.63. The problems of transport and consumer priorities would have to be carefully examined by the Government before a decision could be taken that it would be in the national interest to allow the economics of coal to be settled completely by market forces.

(Paragraph 28.2.2.)

34.64. Some chronic railway bottle-necks are yet to be removed. Shortage of transport is a problem the end of which is not in sight and some measure of control would be needed to see that all priority consumers get their needs and in a type of coal suited to their needs.

(Paragraph 28.3.1.)

34.65. We have no doubt that the encouragement of the use of soft coke to stop the burning of valuable cattle manure and timber has become a matter of national importance. A national plan for the production and distribution of soft coke is overdue and such a plan will involve allocations of coal and regulation of transport.

(Paragraph 28.4.1.)

34.66. Assam is an isolated part of the Union and for strategic reasons coal production should, we presume, be maintained at a fair level of production in this area. Before the question of decontrol of Assam coals is considered it is necessary that the Central and State Governments should confer and take into consideration the various aspects we have touched upon but which we have not been able to go into in any detail in this report.

(Paragraph 28.6.2.)

34.67. We are of the view that there is a good case for the lifting of control over Grades II and III of non-coking coal and of all the production of Singareni Collieries Co. with or without the retention of ceiling prices. We recommend that this be done. As regards superior non-coking coals and coking coals it is in our view desirable to take a decision after the results of the decontrol recommended by us are watched for some time and there is fuller appreciation of the capacity of railway transport to meet demand which is not regulated or controlled.

(Paragraph 28.6., 28.6.1 and 28.7.)

XVIII Washeries and Washery by-products

34.68. We have noticed that a good deal of grade E coking coal is washed and the reason given is that though it could be used without beneficiation if fully up to grade E, it is desirable to wash it to secure a uniform 17 ± 0.5 per cent ash content. This is an issue which we consider that Government might very well re-examine.

(Paragraph 29.5.1.)

34.69. Arguments for or against unit or central washeries may well be examined by a special committee of experts of the mining and steel industries. Should unit washeries find favour with the Government, it would be necessary to find ways and means for generating funds or loans with which unit washeries could be set up by collieries singly or in combination.

(Paragraph 29.5.5.)

34.70. It needs to be investigated if soft coke for domestic use could be produced from by-products. Research and development in this respect would be of value. It would be a national loss not to utilise these by-products fully.

(Paragraph 30.2.2.)

34.71. The problem of by-products of washeries can be met only by incentives to power station operators and soft coke producers to install the necessary equipment to make use of these "wastes". These incentives must be strong enough to justify the capital investment needed, and the price will have to be kept steady over a long period.

(Paragraph 30.4.1.2.)

34.72. It is clear that middlings/by-products of washeries and slack coal will be surplus by 1970-71, and embarrassingly so, from 1980-81 onwards. Suitable markets should be created with price incentives to meet the problem.

(Paragraph 30.5.)

34.73. It would not be practicable or fair to have a uniform price for washed coal.

(Paragraph 31.4.)

34.74. We do not think that it would be correct to treat middlings and by-products as of no economic value considering that they contain combustible material capable of producing considerable heat.

(Paragraph 32.6.)]

34.75. We recommend that the price formula referred to in paragraph 32.5.1, save for the replacement of Rs. 3 for Rs. 2 towards rebate in sub-para of that paragraph be adopted for pricing washery middlings and by-products.

(Paragraph 32.10.)

34.75(A) We recommend :

- (1) that no excise duties be levied on despatches of coal to a washery,
- (2) that duties be charged only on washed coal and not on middlings or rejects.

If there should be any serious administrative difficulty in respect of (1) above or any scope for fraud, we would recommend in the alternative that no duties be charged on despatches of washery products from a washery.

(Paragraph 32.11.4.4.)

XIX *Soft Coke*

34.76. Unless the increased cost of sophisticated carbonization can be more or less met by the value of by-products it is doubtful if soft coke can withstand competition from other non-commercial sources of energy.

(Paragraph 33.9.)

34.77. The ceiling price of soft coke may be fixed at Rs. 38 *per tonne* f.o.r. Suitable adjustments may be made in this price as the ceiling price of Grade III B goes upwards or downwards on the basis of the formula, viz., a change of of Rs. 1 in the price of Grade III B coal would be reflected by a change of Rs. 1.40 in that of soft coke.

(Paragraph 33.11.4.)

34.78. Improvement in the transport facilities for soft coke, greater regional availability of soft coke by the utilisation of low grade coals in outlying collieries and rationalisation of freight rates in order to bring about a partial equalisation of prices all over the country are matters which need the attention of Government.

(Paragraph 33.8.)

Acknowledgements

We wish to express our thanks to colliery and washery owners, dealers, consumers and their associations and the labour unions associated with the coal industry who furnished us with detailed information and to their representatives who gave evidence before us. Our thanks are also due to Shri A.C. Bose, the Coal Controller and his organisation, Dr. A. Lahiri, Director, Central Fuel Research Institute, the various concerned Government Departments and the Joint Working Committee for their valuable assistance in connection with this inquiry.



M. C. PAI
Chairman

M. ZAHEER
Member

K. T. MERCHANT
Member

P. V. GUNISHASTRI
Secretary.

Bombay,
25th July, 1967.

APPENDIX I

GOVERNMENT OF INDIA

MINISTRY OF COMMERCE

New Delhi, the 27th August, 1966

RESOLUTION

(*Vide para 1.1*)

No. 20(2)-Tar/66.—The existing price structure of coal is based on the recommendations of the Coal Price Revision Committee appointed by the Government of India in 1957. After examining the cost of production of coal and coke in the country, the Committee worked out the cost of production as it should be in a colliery managed with reasonable efficiency and economy and facing no special difficulties, and recommended a price structure allowing a reasonable margin of profit. Government adopted the price structure as recommended by the Committee and also accepted its recommendation that appropriate changes in the prices should be allowed from time to time to cover increases in the cost of raising coal. This price structure has remained in force since and several changes in price have been allowed. Besides, Government allowed on different occasions a increase in price as an incentive for increased production of certain grades and varieties of coal.

2. The Coal Industry has been representing for some time that since the appointment of the Coal Price Revision Committee, conditions have changed substantially and there has been a general increase in the prices of all commodities, with the result that the current prices do not offer adequate returns.

3. Though a Study Group has been appointed to make a quick assessment whether increases in cost of production have been fully neutralised, it is considered necessary that there should be a comprehensive enquiry into the question of the price of coal as coal is of basic importance to the economy of the country. It is necessary that the Coal Industry should develop properly and systematically with due regard to the interests of conservation and achieve the additional production of metallurgical coal necessary to meet the requirements of the rapidly expanding iron and Steel Industry. The production of higher grades of non-coking coals which has also remained static for a long time must also increase particularly for export.

4. The Government of India have accordingly decided that the Tariff Commission may undertake a comprehensive enquiry under Section 12(d) of the Tariff Commission Act, 1951, into the cost of production of coal and coke in the country and make suitable recommendations in regard to the price structure of coal and coke which may be

adopted having regard to the future needs of the Coal Industry as well as of the industries and other major consumers of coal. The recommendations should also take into account the need for conservation of the higher grades of coals which are in short supply and for encouraging wider use of lower grades of coal.

5. The terms of reference of the enquiry will be as stated below :—

- (1) to examine and report upon the cost of production of coal/coke in the country taking into account *inter alia* various items which go into the cost of production, including the awards and other relevant factors that have a bearing on the future coal production programme;
- (2) to examine and report whether in view of the comparative scarcity of higher grades of coal in the country and the imperative need for conserving them, and the need for encouraging the wider use of lower grades of coal, there should be bigger differentials than now exist between the prices of higher grades of coal and those of the lower grades;
- (3) to recommend suitable price structure for different grades of coal produced in different regions;
- (4) to suggest suitable pricing system for washed coal and washery by-products;
- (5) to recommend the basis on which prices should be revised in future;
- (6) to consider and report on the impact of price changes that the Commission would recommend on the economy of the country and on coal consuming industries generally; and
- (7) to examine and report whether an increase in the cost of labour, wages, increase in stores cost etc., could not be neutralised by scientifically organised and planned development, modernising and mechanising the mines and by efficient management leading to increased productivity.

6. The Tariff Commission is requested to submit its report within six months.

7. Firms or persons interested in the matter, who desire that their views should be considered, should address their representations to the Secretary, Tariff Commission, C.G.O. Building, 101, Queen's Road, Bombay-1.

ORDER

Order that a copy of this Resolution be published in the Gazette of India and that a copy thereof communicated to all concerned.

(K. B. LALL)

Secretary to the Government of India.

APPENDIX II

(Vide Paragraph 3-5)

List of parties from whom replies to Commission's questionnaires/letters or memoranda were received

PRODUCERS :

1. The Kuardi Coal Co. Ltd., 41, Chowringhee Road, Calcutta-16.
Kuardi Colliery.
2. The Hingir-Rampur Coal Company Ltd., Killick House,
Home Street, Fort, Bombay-1.
Hingir-Rampur Colliery.
3. Aluminium Corporation of India Ltd., 7, Council House
Street, Calcutta-1.
Jaykaynagar Colliery.
4. The Associated Cement Companies Ltd., Cement House,
121, Queen's Road, Bombay-1.
(i) Kotma Colliery.
(ii) Nowrozabad Colliery.
5. The Tata Iron and Steel Co. Ltd., Jamshedpur.
(i) Jamadoba Colliery.
(ii) 6 & 7 Pits Colliery.
(iii) Ligwadih Colliery.
(iv) Malkera Choitodin Colliery.
(v) Sijua Colliery.
(iv) Bhelatand Colliery.
6. West Bokaro Limited, 23-B, Netaji Subhas Road, Calcutta-1.
West Bokaro Colliery.
7. D. Bright & Co. (P) Ltd., 15/A, Clive Row, Calcutta-1.
Bright's Rana Colliery.
8. J. P. Lalla & Sons, Post Box No. 76, P. O. Dhanbad.
Tundu Khas Colliery.

9. Dadabhoy's New Chirimiri Ponri Hill Colliery Co. Pvt. Ltd.,
Temple Road, Post Box No. 85, Nagpur-1.
New Chirimiri Ponri Hill Colliery.
10. Shethia Mining & Manufacturing Corporation Ltd., F-2,
Gillander House, 8, Netaji Subhas Road, Calcutta-1.
New Satgram Colliery.
11. National Coal Development Corporation, Darbhanga House,
Ranchi.
 - (i) Pilot Quarry, Korba Collieries.
 - (ii) Ramsagar Incline No. 1 & 2, Korba Collieries.
 - (iii) Ramsagar Incline No. 3 & 4 Korba Collieries.
 - (iv) N. C. D. C. Colliery.
12. The Bengal Coal Co. Ltd., 8, Clive Row, Calcutta-1.
 - (i) Banksimula 7 & 8 Pits Colliery.
 - (ii) Chinakuri 1 & 2 Pits Colliery.
 - (iii) Chinakuri 3 Pits Colliery.
 - (iv) Girimint Colliery.
 - (v) Kunustoria Colliery.
 - (vi) Parbelia Colliery.
 - (vii) Poidih Colliery.
 - (viii) Sanctoria Colliery.
 - (ix) Seetalpur Colliery.
 - (x) Sodepore 9 & 10 Pits Colliery.
 - (xi) Adjai II Colliery.
 - (xii) Raniganj Colliery.
 - (xiii) Chanch Colliery.
 - (xiv) Marulidih 20/21 Pits Colliery.
 - (xv) Old Marulidih Colliery.
 - (xvi) Rajhara Colliery.
13. The Assam Railways & Trading Co. Ltd., Margherita, Assam.
 - (i) Baragolai Colliery.
 - (ii) Namdang Colliery.
 - (iii) Ledo Colliery.
 - (iv) Hipong Colliery.

14. The Burrakur Coal Co. Ltd., Chartered Bank Building, Calcutta-1.
 - (i) Saltore Colliery.
 - (ii) Loyabad Colliery.
 - (iii) Bankola Colliery.
 - (iv) Katras Colliery.
 - (v) Mudidih Colliery.
15. The New Beerbhoom Coal Co. Ltd., 8, Clive Row, Calcutta-1.
 - (i) Victoria Colliery.
 - (ii) Victoria West Colliery.
 - (iii) Barmondia Colliery.
 - (iv) New Kendah Colliery.
16. M/s. S. C. Rungta Colliery, P.O. Rungta Colliery, Via-Burhar (M. P.) S. E. Rly., Dist. Shahdol.
Rungta Colliery.
17. Hind Shippers Private Ltd., 135, B.R.B. Road, Calcutta-1.
Sendra Colliery.
18. Shaw Wallace & Company Ltd., The Amalgamated Coalfields Ltd., The Pench Valley Coal Company Ltd., Rewa Coalfields, Limited, 4, Bankshall Street, Calcutta-1.
 - (i) Dalta West Colliery.
 - (ii) Eklehra Colliery.
 - (iii) Tatachappa Colliery.
 - (iv) Bhamori Colliery.
 - (v) Rawanwara Colliery.
 - (vi) Chandametta Colliery.
 - (vii) North Chandametta Colliery.
 - (viii) East Dongarchickli Colliery.
 - (ix) Barkui Colliery.
 - (x) Burhar No. 1 & 2 Colliery.
 - (xi) Burhar No. 3 Colliery.
 - (xii) Amlai Colliery.
 - (xiii) Umria Colliery.
19. The Parasea Collieries Ltd., 25, Netaji Subhas Road, Calcutta-1.
Parasea Colliery.

20. M/s. Khas Kusunda Coal Co. (P) Ltd., P-564, Lake Road, Calcutta-29.
Khas Kusunda Colliery.
21. Palana Colliery State Enterprises Deptt., Jaipur.
Palana Colliery.
22. Lodna Colliery Co. (1920) Ltd., Morrison & Co. Ltd., 6, Lyons Range, Calcutta-1.
Lodna Colliery.
23. M/s. Indra Singh & Sons Private Ltd., Prop. West Chirimiri Colliery, P. O. Chirimiri, Dist. Surguia (M. P.).
Chirimiri Colliery.
24. The Singareni Collieries Co. Ltd., P. O. Kothagudem Collieries, Khammam District (A. P.).
Singareni Colliery.
25. Equitable Coal Company Limited, 2, Fairlie Place, Calcutta-1.
(i) Ranipur Colliery.
(ii) Bhanora Colliery.
26. North West Coal Co. Ltd., 23A, Netaji Subhas Road, Calcutta-1.
Ena Colliery.
27. The Borrea Coal Company Limited, Chartered Bank Building, Calcutta-1.
Bhagaband Colliery. सत्यमेव जयते
28. The Karanpura Collieries Ltd., Chartered Building, Calcutta-1.
Saunda Colliery.
29. The South Karanpura Colliery Co. Ltd., Chartered Bank Building, Calcutta-7.
Sirka Colliery.
30. The East Sathgram Coal Co. (Pvt.) Ltd., 735, Canning Street, Calcutta-1.
(i) East Sathgram Colliery.
(ii) North Brook Colliery.
31. The East Religara Coal Co. (Pvt.) Ltd., 135, Canning Street, Calcutta-1.
Religara Colliery.

32. Sendra Bansjora Colliery Co. (Pvt.) Ltd., P. O. Bansjora,
Dist. Dhanbad.
Sendra Bansjora Colliery.
33. The East Indian Coal Co. Ltd., 4, Clive Row, Calcutta-1.
(i) South Bulliari Colliery.
(ii) Kendwadih Colliery.
34. The Bhulanbararee Coal Co. Ltd., 4, Clive Row, Calcutta.
Bhulanbararee Colliery.
35. Ballarpur Collieries Co., P. O. Box No. 11, Temple Road,
Nagpur.
Ballarpur Colliery.
36. Samla Collieries Ltd., 33, Netaji Subhas Road, Calcutta.
Samla Colliery.

PRODUCERS ASSOCIATION :

37. Joint Working Committee, Indian Mining Association, Indian
Mining Federation, Indian Colliery Owners Association,
M. P. & Vidarbha Mining Association, 6, Netaji Subhas Road,
Calcutta-1.
38. Soft Coke Producers Collieries Association, Ashok Nagar,
Post Box No. 40, Dhanbad.

CONSUMERS :

1. The Scindia Steam Navigation Co. Ltd., 33, Netaji Subhas
Road, Calcutta-1.
2. The Central India Spg., Wvg. & Mfg. Co., The Express Mills,
Nagpur.
3. The Bengal Chemical & Pharmaceutical Works Ltd., 6, Ganesh
Chunder Avenue, Calcutta-13.
4. Bombay Alloys & Castings, Lake Road, Bhandup, Bombay-78.
5. The Bombay Gas Co. Ltd., Empire Building, 214, Hornby Road,
Fort, Bombay-1.
6. Madras Port Trust, Madras.
7. M/s. Tata Chemicals Ltd., 26, Rajendranath Mukherjee Road,
Calcutta-1.
8. M/s. Ferro Alloys Corporation Ltd., Post Box No. 9, Shreeram
Bhawan, Tumsar (Maharashtra).
9. The Kumardhubi Fireclay & Silica Works, Chartered Bank
Building, Calcutta-1.

10. M/s. Straw Products Ltd., Rabindra Sarani, Calcutta-1.
11. The Rohtas Industries Ltd., Dalmianagar, Bihar.
12. Indian Jute Mills Association, 6, Netaji Subhas Road, Calcutta-1.
13. The Indian Cable Co. Ltd., 9, Hare Street, Calcutta-1.
14. Jharia Firebricks & Pottery Works Pvt. Ltd., Dhansar.
15. Alembic Chemical Works Ltd., Industrial Area, Baroda-3.
16. Somaiya Organo Chemicals Ltd., Sakarwadi, Dist. Ahmednagar.
17. Cement Manufacturers Associations, Cement House, 121, Queen's Road, Bombay-1.
18. The Andhra Cement Co. Ltd., Post Box No. 301, Post Office Gandhinagar, Vijayawada-3. Andhra Pradesh.
19. Sri Sarvaraya Sugars Ltd., Chelluru, Dist. East Godavari.
20. Balpahar Refractories Ltd., Orissa.
21. Bharat Chamber of Commerce, Calcutta-7.
22. Deccan Sugar Abkhari Co. Ltd., Samalkot, Dist. East Godavari.
23. The Mysore Iron & Steel Ltd., Bhadravati, Mysore State.
24. Kesar Sugar Works Ltd., Baheri, Dist. Bareilly.
25. Jaypore Sugar Co. Ltd., Rayaghada.
26. M/s. Tata Iron & Steel Co. Ltd., Agent's Office, 23/B, Netaji Subhas Road, Calcutta-1.
27. Alco Chem. Ltd., Seohara (Dist. Binjar).
28. The Indian Standard Wagon Co. Ltd., 12, Mission Row, Calcutta-1.
29. Government Distillery, Chitli.
30. Engineering Association of India, 87, Veer Nariman Road, Bombay-1.
31. The Indian Steel & Wire Production Ltd., Indranagar, Dist. Manbhum.
32. Dyer Meakin Breweries Ltd., Mohannagar (Ghaziabad).
33. Indian Sugar Mills Association, India Exchange, Calcutta-1.

34. Central Distillery & Chemical Works Ltd., Meerut Cantt.
35. The Tinsplate Company of India Ltd., 4, Bankshall Street, Calcutta-1.
36. Indian Sugar & Refineries Ltd., Chhitadigi Road, Hospet.
37. All India Distillers Association, H-37, Connaught Circus, New Delhi.
38. Calcutta Port Trust, Calcutta.
39. Bombay Port Trust, Bombay.
40. Development Commissioner, Small Scale Industries, Udyog Bhuvan, New Delhi.
41. Indian Paper Mills Association, India Exchange, India Exchange Place, Calcutta-1.
42. The Dharamsi Morarji Chemical Co. Ltd., Prospect Chambers, 317-21 Dr. Dadabhai Naoroji Road, Bombay-1.
43. The Jaipur Udyog Limited, P. O. Ram Krishna Lok, Sawaimadhorpur (W. Rly).
44. Khandelwal Ferro Alloys Ltd., "Khandelwal Bhavan", 166, Dr. Dadabhai Naoroji Road, Bombay-1.
45. The Godavari Sugar Mills Ltd., Fazalbhoy Building, Mahatma Gandhi Road, Fort, P. B. No. 122A, Bombay-1.
46. Carew & Co. Limited, Rosa, U. P.
47. The Oudh Sugar Mills Limited, Industry House, 159, Churchgate Reclamation, Bombay-1.
48. All India Cottonseed Crushers' Association, Room No. 68, 6th Floor, Alli Chambers, Tanrind Lane, Fort, Bombay-1.
49. Hindustan Lever Limited, Hindustan Lever House, Backbay Reclamation, Bombay-1.
50. Indian Woollen Mills' Federation, G-4, Advent Building, Foreshore Road, Bombay-1.
51. The Maharashtra Sugar Mills Ltd., Industrial Assurance Building, Churchgate, Bombay-1.
52. Orissa Cement Limited, Rainagar.
53. The Bhilai Steel Plant, Hindustan Steel Ltd., P. O. Hinoo, Ranchi.
54. Hindustan Steel Ltd.
 - (i) Durgapur Steel Plant.
 - (ii) Rourkela Steel Plant.

55. Maha Vidarbha Chamber of Commerce & Industries, Nagpur.
56. Kanpur Electricity Supply Administration (U. P. State Electricity Board), Kesa House, 14/71, Civil Lines, Kanpur (U. P.).
57. The Calcutta Electricity Supply Corp., Ltd., Victoria House, Chowringhee Square, Calcutta.
58. Madhya Pradesh Electricity Board, Rampur, Jabalpur.
59. The Superintending Engineer, Madras State Electricity Board, 157, Mount Road, Madras-2.
60. Tata Hydro-Electric Power Supply Co. Ltd., Post Box No. 192, Bombay-1.
61. The Chief Engineer, Maharashtra State Electricity Board, Mercantile Bank Building, Mahatma Gandhi Road, Bombay-1.
62. Bihar State Electricity Board, Patna.
63. The Gujarat Electricity Board, Baroda.
64. The Chief Engineer, Punjab State Electricity Board, Patiala.
65. The Chief Engineer, Andhra Pradesh State Electricity Board, Khairabad, Hyderabad (A. P.).

CONSUMERS ASSOCIATION :

66. Coal Consumers Association of India, India Exchange (7th Floor), Calcutta-1.
67. Northern India Coal Consumer Association, 57, Regal Building, New Delhi.

DEALERS :

1. M/s. Girdharlal & Co., 48, Poddar Chambers, Parsi Bazar Street, G.P.O. Box No. 826, Bombay.
2. M/s. T. M. Shah, 8, Lyons Range, Post Box No. 2480, Calcutta-1.
3. M/s. Kharkhari Coal Co. Pvt. Ltd., Bharat Bhawan, 3, Chittaranjan Avenue (South), Calcutta-13.
4. The Universal Coal (P) Ltd., Coal Merchants, Darabshaw House, 1st Floor, Ballard Road, Ballard Estate, Fort, Bombay-1.
5. M/s. Eastern Bunkers Ltd., Scindia House, Dougali Road, Ballard Estate, Bombay.
6. M/s. Bengal Coal Supplying Firm, 511, Budhwar Peth, Poona City-2.

7. M/s. Chhonilal Manilal Ltd., Yusuf Buildings, Church Gate Street, Fort, Bombay-1.
8. M/s. Joti Prasad Tayal, Belanganj, Agra (U. P.).
9. M/s. V. N. Ranjan & Co., Post Box No. 262, 90, Coral Merchant Street, Madras-1.
10. M/s. Narsingdas Jaggiwan, 17, Snehlata Ganj, Street No. 4, Indore.
11. M/s. Nanalal M. Verma & Co. (P) Ltd., 135, Canning Street, Post Box No. 2214, Calcutta-1.
12. M/s. Maharashtra State Co-operative Marketing Society Ltd., Kanmoor House, Narshi Nath Street, Post Box No. 5080, Bombay-9.
13. M/s. K. C. Thapar & Bros. C. S. Ltd., Thapar House, 25, Brabourne Road, Calcutta-1.

DEALERS ASSOCIATION :

14. Indian Coal Merchants Association, P. O. Jharia.

WASHERIES :

1. M/s. Hindusthan Steel Ltd., P. O. Hinoo, Ranchi, Durgapur Washery.
2. Jamdoba Central Washing Plant, M/s. Tata Iron & Steel Co. Ltd., Tatanagar, Jemshedpur.
3. West Bokaro Washery Plant, M/s. West Bokaro Ltd., West Bokaro, Bihar.
4. Lodna Washery Plant, M/s. Lodna Colliery Co. (1920) Ltd., P. O. Bhaga, Dhanbad.
5. Nowrozabad Washery Plant, M/s. Associated Cement Co. Ltd., Nowrozabad, Madhya Pradesh.
6. Kargali Washery Plant, M/s. National Coal Development Corpn., Ltd., Darbhanga House, Ranchi.
7. M/s. Hindusthan Steel Ltd., P. O. Hinoo, Ranchi
 - (i) Ratherdih Washery Plant.
 - (ii) Dugda Washery Plant.
 - (iii) Bhojudih Washery Plant.

COAL MINING MACHINERY :

1. Mining & Allied Machinery Corpn., Durgapur.
2. Meamaco Limited, 4, Clive Row, Calcutta.
3. M/s. Tata Engineering & Locomotive Co., Bombay House, 24, Bruce Street, Fort, Bombay-1.

LABOUR UNIONS :

1. The Indian National Mineworkers' Federation, 9, Elgin Road, Calcutta-20.
2. Madhya Pradesh Colliery Workers' Federation, P. O. Chirimiri, Dist. Surguja.
3. Palana Colliery Mazdoor Union, Khajanchi Building, K.E.M. Road, Bikaner.

GOVT. DEPTS. AND OTHER PUBLIC BODIES :

1. The Coal Controller, 1, Council House Street, Calcutta-1.
2. National Coal Development Corporation, Ranchi.
3. Director General of Technical Development, New Delhi.
4. High Commission in Pakistan, Islamabad.
5. Minerals & Metals Trading Corpn., New Delhi.
6. Ministry of Mines & Metals, Government of India, New Delhi.
7. Planning Commission, New Delhi.
8. Central Water & Power Commission, New Delhi.
9. Central Board of Excise & Customs, New Delhi.
10. Coal Superintendent, Dhanbad.
11. Geological Survey of India, Calcutta.
12. The Coal Board, Calcutta.
13. Ministry of Commerce, The Chief Controller of Import & Export, New Delhi.
14. Railway Board, New Delhi.
15. Department of Iron & Steel, New Delhi.
16. Ministry of Irrigation & Power, New Delhi.
17. Ministry of Labour, Employment & Rehabilitation, Dhanbad.
18. Department of Mines & Geology, New Delhi.
19. The Director of Industries, Government of Gujarat, Ahmedabad.
20. The Director of Industries, Government of Kerala, Trivandrum.
21. The Director of Industries, Government of Mysore, Bangalore.
22. The Director of Industries, Government of Madhya Pradesh, Bhopal.

23. The Director of Industries, Government of Madras, Madras.
24. The Chief Secretary to the Government of Mysore, Bangalore.
25. The Secretary to the State Enterprises Department, Government of Rajasthan, Raipur.
26. The Chief Secretary to the Government of West Bengal, Calcutta.
27. The Director of Industries, Government of West Bengal, Calcutta.
28. Director of Industries, Government of Maharashtra, Bombay.
29. Director of Industries, Government of Bihar, Patna.
30. Chief Secretary, Government of Bihar, Patna.
31. The Chief Secretary, Government of Madhya Pradesh, Bhopal.



APPENDIX III

(Vide para 3.8)

List of persons who attended commission's public inquiry and group discussions

(a) List of persons who attended Commission's Preliminary discussions with Consumers on 2-5-1967.

Name	Representing
1. Shri K. H. Desai . . .	Coal Consumers' Association of India, India Exchange, (7th Floor), Calcutta-1.
2. Shri H. P. Shroff . . .	Tata Chemicals Ltd., Bombay House, Bruce Street, Bombay-1.
3. Shri F. K. Jhaveri . . .	
4. Shri P. Sarma . . .	
5. Shri T. R. Balakrishnan . . .	
6. Shri J. M. Munshi . . .	Tata Hydro-Electric Power Supply Co. Ltd., Bombay House, Bruce Street, Bombay-1.
7. Shri S. P. Manaktala . . .	
8. Shri C. N. Siodia . . .	
9. Shri Tata Rao . . .	Madhya Pradesh Electricity Board, Rampur, Jabalpur.
10. Shri Koli . . .	
11. Shri L. N. Deshpande . . .	Maharashtra State Electricity Board, Mercantile Bank Building, Mahatma Gandhi Road, Bombay-1.
12. Shri P. T. Seshan . . .	
13. Dr. T. P. S. Rajan . . .	Indian Chemical Manufacturers Association, Sir Vithaldas Chambers, 16, Apollo Street, Bombay-1.
14. Shri A. M. Gadgil . . .	

(b) List of persons who attended Commission's Preliminary Discussions with the representatives of Labour Unions on 2-5-1967.

1. Shri Kanti Mehta . . .	Indian National Mines Workers' Federation, 9, Elgin Road, Calcutta-20.
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APPENDIX III—Contd.

Name	Representing
2. Shri N. K. Karunakaran . . .	United Trade Union Congress, Mahashya House, 5th Road, Santa Cruz, Bombay-55.
3. Shri Mahesh Desai . . .	Hind Mazdoor Sabha, National House, 2nd Floor, 6, Tulloch Road, Bombay-1.

(c) List of persons who attended Commission's Preliminary Discussions with the representatives of (i) Coal Controller, (ii) Directorate General of Mines Safety and (iii) Coal Board on 3-5-1967.

1. Shri C. Prakash, Joint Director of Mines Safety.	Directorate General of Mines Safety, Dhanbad.
2. Shri A. K. Jana, Financial Adviser & Chief Cost Accounts Officer.	Coal Board, 11/A, Hastings Street, Calcutta-1.
3. Shri A. K. Mithra, Chief Mining Engineer.	Coal Controller, 1, Council House Street, Calcutta-1.

(d) List of persons who attended Commission's Public Inquiry held on 4th and 5th May, 1967.

PRODUCERS' ASSOCIATIONS :

1. Shri S. I. Mehta . . .	} Indian Mining Association, Royal Exchange, 6, Netaji Subhas Road, Calcutta-1.
2. Shri R. Lall . . .	
3. Shri P. R. Mahadevan . . .	
4. Shri A. L. Mayadas . . .	
5. Shri V. K. Seth . . .	
6. Shri R. M. Macdonald . . .	
7. Shri K. N. Dutta . . .	} Indian Mining Federation, 135, Biplabi Rashbehari Road, Calcutta.
8. Shri V. K. Poddar . . .	
9. Shri H. N. Mokherjee . . .	
10. Shri M. L. Agarwalla . . .	} Indian Colliery Owners' Association, Post Box No. 70, Dhanbad.
11. Shri Rasiklal Woraha . . .	
12. Shri R. K. Goenka . . .	

APPENDIX III—Contd.

Name	Representing
13. Shri F. Meneill . . .	M. P. & V. Mining Association, Post Box No. 8, Nagpur.
14. Shri V. L. Kasunde . . .	} Singareni Collieries, Meher } Manzil, Red Hills, Hyder- } abad.
15. Shri G. V. S. Sastry . . .	
16. Shri L. K. Gopalakrishnan . . .	Assam Railways & Trading Co. (A.R.T.C.) Margherita, Assam.

CONSUMERS' ASSOCIATION :

1. Shri H. P. Shroff . . .	} Tata Chemicals Ltd., Bombay } House, Bruce Street, Bombay-1. } . } .
2. Shri T. R. Balakrishnan . . .	
3. Shri P. Sarma . . .	
4. Dr. S. M. M. Safvi . . .	
5. Shri R. J. Mehta . . .	} Indian Sugar Mills Association, } Indian Exchange, Calcutta-1.
6. Shri M. N. Pittie . . .	
7. Shri T. P. S. Rajan . . .	} Indian Chemical Manufacturers' } Association, Sir Vithaldas } Chambers, 16, Apollo Street, } Bombay-1.
8. Shri A. M. Gadgil . . .	
9. Shri S. N. Dingonkar . . .	} All India Distillers' Associa- } tion, H-37, Connaught Circus, } New Delhi.
10. Shri J. S. Huja . . .	
11. Shri B. M. Dutta . . .	
12. Shri R. M. Sharma . . .	} Coal Consumers' Association } of India, Indian Exchange } (7th Floor), Calcutta-1.
13. Shri K. M. Desai . . .	
14. Shri V. N. Phadke . . .	Tata Iron & Steel Co. Ltd., Bombay House, 24, Bruce Street, Fort, Bombay-1.

ELECTRICITY BOARDS :

1. Shri Tata Rao . . .	} Madhya Pradesh Electricity } Board, Rampur, Jabalpur.
2. Shri Koli . . .	

APPENDIX III—Contd.

Name	Representing
3. Shri P. T. Seshan . . .	} Maharashtra State Electricity Board, Mercantile Bank Building, Mahatma Gandhi Road, Bombay-1.
4. Shri C. N. Deshpande . . .	
5. Shri J. M. Munshi . . .	} Tata Hydro-Electric Power Supply Co. Ltd., Bombay House, Bruce Street, Bombay-1.
6. Shri S. P. Manaktala . . .	
7. Shri C. N. Siodia . . .	

COAL MERCHANTS' ASSOCIATION :

1. Shri S. D. Thaker . . .
 2. Shri D. Kakar . . .
 3. Shri H. K. Tharafdar . . .
- } Indian Coal Merchants' Association, Jharia, Dhanbad.

LABOUR UNIONS :

1. Shri Kanti Mehta . . .
 2. Shri N. K. Karunakaran . . .
 3. Shri Mahesh Desai . . .
- } Indian National Mines Workers Federation, 9, Elgin Road, Calcutta-20.
- } The United Trade Union Congress, Mahashya House, 5th Road, Santacruz, Bombay-55.
- } Hind Mazdoor Sabha, National House, 2nd Floor, 6, Tulloch Road, Bombay-1.

WASHERIES :

1. Shri S. N. Kaza . . .
 2. Shri J. H. Bharucha . . .
 3. Shri G. V. Joshi . . .
 4. Shri J. S. Watcha . . .
- } Durgapur Washery M/s. Hindustan Steel Ltd., P. O. Hinoq, Ranchi.
- } Nowrozabad Washery Plant, M/s. Associated Cement Co. Ltd., Nowrozabad, Madhya Pradesh.
- } West Bokaro Washery Plant, West Bokaro, Bihar.

APPENDIX III—Contd.

Name	Representing
5. Shri P. C. Bose . . .	Lodna Washery Plant, M/s. Lodna Colliery Co. (1920) Ltd., P. O. Bhaga, Dhanbad.
6. Dr. P. Prasad . . .	Hindustan Steel Ltd., P. O. Hinoo, Ranchi.
7. Dr. D. K. Dutta . . .	
8. Dr. A. N. Mukherjee . . .	
9. Shri D. L. Basu . . .	
10. Shri S. N. Kaza . . .	
11. Shri T. Gopalakrishnan . . .	
12. Shri M. V. B. Murthy . . .	
13. Shri J. S. R. Durairaj . . .	
14. Shri N. Bhattacharya . . .	

GOVERNMENT DEPARTMENTS :

1. Shri S. G. Gugnani . . .	Ministry of Steel, Mines and Metals, Government of India, New Delhi.
2. Shri K. S. R. Chari . . .	
3. Shri A. K. Mithra . . .	Coal Board, 11/A, Hastings Street, Calcutta.
4. Shri A. K. Jana . . .	
5. Dr. A. P. Subramanian . . .	Director General of Geological Survey of India, 27, Chow- ringhee Road, Calcutta.
6. Shri S. Bagchi . . .	Central Fuel Research Institute, Dhanbad.
7. Shri C. Prakash . . .	Directorate General of Mines Safety, Dhanbad.
8. Shri R. K. Sen . . .	Central Water & Power Com- mission, New Delhi.
9. Shri S. L. Chakravarthi . . .	Director of Industries, Govern- ment of West Bengal, Cal- cutta.
10. Shri R. K. Mathur . . .	Railway Board, New Delhi.
11. Shri Y. R. Puri . . .	

APPENDIX III—Contd.

Name	Representing
12. Dr. B. Singh	Central Mining Research Station, Barwa Road, Post Box No. 50, Dhanbad.
13. Shri P. A. Sabnis	Director of Industries, Government of Maharashtra, Bombay.
14. Shri J. T. Parikh	Industrial Credit and Investment Corporation of India, 163, Backbay Reclamation, Bombay-1.
(e) List of Persons who attended Commission's discussions with Washeries on 27-5-1967.	
1. Shri B. H. Engineer	Jamadoba Washery, Tatanagar, Jamshedpur & West Bokaro Washery, West Bokaro, Bihar.
2. Shri V. N. Phadke	Jamadoba Washery, Tatanagar, Jamshedpur.
3. Shri J. K. Bharucha	Nowrozabad Washery, Nowrozabad, Madhya Pradesh.
4. Shri P. S. Watcha	West Bokaro Washery, West Bokaro, Bihar.
5. Shri P. K. Bose	Lodna Washery, P. O. Bhaga, Dhanbad.
6. Shri D. K. Basu	} Hindusthan Steel Ltd., P. O. Hinoo, Ranchi.
7. Shri Kaza	
8. Dr. P. Prasad	
9. Shri K. R. Saksena	
10. Shri M. Parthasarathi	Durgapur Washery, P. O. Hinoo, Ranchi.
11. Shri R. K. Ozha	} National Coal Development Corporation, Darbhanga House, Ranchi.
12. Shri D. P. Gupta	
13. Shri J. P. Srivastva	

APPENDIX III—*Concl'd.*

Name	Representing
GOVERNMENT DEPARTMENTS & OTHERS :	
1. Shri S. P. Gugnani . . .	} Ministry of Steel, Mines & Metals, Government of India, New Delhi.
2. Shri K. K. Dhar . . .	
3. Shri K. S. R. Chari . . .	
4. Shri A. K. Mithra . . .	Coal Board, 11/A, Hasting Street, Calcutta.
5. Shri A. K. Ghose . . .	Central Water & Power Com- mission, New Delhi.
6. Shri M. K. Prasad . . .	} Damodar Valley Corporation, Anderson House, Alipore, Calcutta-27.
7. Shri M. W. Gokhalany . . .	
8. Shri V. B. Ahuja . . .	Railway Board, New Delhi.
9. Shri R. N. Kapur . . .	} Indian Iron & Steel Co. Ltd., 12, Mission Row, Calcutta-1.
10. Col. G. C. Dubey . . .	
11. Shri V. K. Seth . . .	Joint Working Committee, 6, Netaji Subhas Road, Cal- cutta-1.

सत्यमेव जयते

APPENDIX IV-A

(Vide para 6.3.4)

Statement showing the price increases of Non-coking coal (R.O.M.) granted with reasons for such increase.

	Notification		West Bengal/Bihar			
	No.	Date	Increase (per ton)	Price of Coal (per ton)	R.O.M. Sel. A. Gr. Non-Coking	
1. Pre Mazumdar	S.R.O. 1557	18-7-55	..	15.38		
2. Mazumdar Award	1568	8-7-56	(+)3.00	18.38		
3. L.A.T. Award (Bengal/Bihar)	2253	8-7-57	(+)1.50	19.88		
4. Interim C.P.R.C., Assam/L.A.T. Award as applicable to A.R. & T.C. Assam.	3513	31-10-57	..	19.88		
5. L.A.T. (Variable D.A.)	870	17-5-58	(+)0.75	20.63		
6. L.A.T. (Adjustment)	2215	17-10-58	(-)0.35	20.28		
7. L.A.T. (Adjustment)	738	2-4-59	(+)0.09	20.37		

APPENDIX IV-A—Contd.

	Notification		West Bengal/Bihar	
	No.	Date	Increase (per ton)	Price of R.O.M. Coal Sel. A. Gr. Non-Coking
8. C.P.R.C.	1894	25-8-59	(+)0.50	20.87
9. Mines Act			(+)0.25	
10. L.A.T. (Variable D.A.)	842	1-4-60	(+)0.50	21.68
11. Grades & Time scale as per Dasgupta Award			(+)0.06	
			(+)0.81	
12. L.A.T. Award as applicable to A.I.T. Collys. S.O. Time Scales/D.G. Award.	1965	6-8-60	..	21.68
13. Grade/Time Scale as per Dasgupta Award	2112	24-8-60	(+)0.06	21.74
14. Grade/Time Scale (D.G. Award)	1294	1-6-61	(+)0.06	21.80
15. Royalty	3095	29-12-61	(+)0.25	22.05
16. Grade/Time Scale D.G. Award (LAT) as applicable to A.R.T. Collys.	1141	12-4-62	..	22.05

17. Grade/Time Scale Dasgupta Award.	•	•	•	•	1717	1-6-62	(+)0.06	22.11
18. Production Incentive (Higher gr. coals)	•	•	•	•	1887	13-6-62	(+)1.50	23.61
19. Provident Fund—Rate Increase	•	•	•	•	3197	20-10-62	(+)0.10	23.71
20. Merchant Award (44 of 1960 A.R.T.C.)	•	•	•	•	131	10-1-63	•	23.71
21. Wage Board	•	•	•	•	577	1-3-63	(+)0.82	24.53
22. L.A.T. (West Bengal/Bihar) Variable D.A.	•	•	•	•	945	1-4-63	(+)0.50	25.03
23. Gr./Time Scale (D.G. Award)	•	•	•	•	1537	1-6-63	(+)0.06	25.09
24. Merchant Award (44 of 1960) A.R. & T.C.	•	•	•	•	2088	8-8-63	•	25.09
25. Neutralisation & Production Incentive (Higher grade Coals).	•	•	•	•	815	3-3-64	(+)1.27	26.36
26. Gr./Time Scale (D.G. Award) Variable D.A.	•	•	•	•	1997	5-6-64	(+)0.06	26.42
26. A/C.A.R.T. Collys. Assam	•	•	•	•				
27. L.A.T. (Variable D.A.)	•	•	•	•	3528	1-10-64	(+)0.50	26.92
28. Wage Board	•	•	•	•	89	1-1-65	(+)0.40	27.32
29. L.A.T. (Variable D.A.)	•	•	•	•	1560	11-5-65	(+)0.41	27.73
30. Gr./Time Scale (D.G. Award)	•	•	•	•	1732	1-6-65	(+)0.06	27.79

APPENDIX IV-A—Contd.

	Notification		West Bengal/Bihar	
	No.	Date	Increase (per ton)	Price of R.O.M. Coal Sel. A. Gr. Non-Coking
31. Merchant Award (44 of 1960) A/c. A.R.T. Colls S.O. (food grain concession).	2702	28-8-65	..	27.79
32. Payment of Bonus Act, 1965 (Interim Wage Increase).	3987	25-12-65	(+) 0.41	28.20
33. Payment of Bonus Act, 1965 (For A.R.T.C. Colls. Assam).	361	29-1-66	..	28.20
34. Royalty rate increase (2½% to 5%) other than Assam Colls.	427	3-2-66	(+) 0.60	28.80
35. L.A.T. (Variable D.A.) .	1202	16-4-66	(+) 0.37	29.17
36. Ditto.	2939	1-10-66	(+) 0.36 (per tonne)	29.54 (per tonne)
37. Ganguli Committee	3957	22-12-66	(+) 0.40 (per tonne)	29.64 (per tonne)
38. Neutralisation	1125	1-4-67	(+) 0.71 (per tonne)	30.35 (per tonne)

APPENDIX IV-B

Prices of coking coal per ton of 2240 lbs. as revised from time to time in Bengal and Bihar Coalfields

Period	Selected 'A'		Selected 'B'		Grade I		Grade II	
	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack
1. Price as on 8th July, 1957 (Increase in 17th May, 1958 Re : V.D.A.)	20.06 (+0.75)	19.06 (+0.75)	18.19 (+0.75)	17.06 (+0.75)				
2. Price as on 17th May, 1958 (Reduction in 17th October, 1958 Re : V.D.A.)	20.81 (-0.34)	19.81 (-0.34)	18.94 (-0.34)	17.81 (-0.34)				
3. Price as on 17th October 1958 (increase in 2nd April, 1959 Re : V.D.A.)	20.47 (+0.09)	19.47 (+0.09)	18.60 (+0.09)	17.47 (+0.09)				
4. Price as on 2nd April, 1959 (Increase in 25th August, 1959 Re : C.P.R.C.)	20.56 (+0.50)	19.56 (+0.50)	18.69 (+0.50)	17.65 (+0.50)				
5. Price as on 25th August, 1959 (Increase in 1st April, 1960 Re : Mines Act, V.D.A. and Das Gupta Award)	21.06 (+0.81)	20.06 (+0.81)	19.19 (+0.81)	18.06 (+0.81)				
6. Price as on 1st April, 1960 (Increase in 24th August 1960 Re : Grade & Time Scale)	21.87 (+0.06)	20.87 (+0.06)	20.00 (+0.06)	18.87 (+0.06)				

APPENDIX IV-B—Contd.

Period	Selected 'A'	Selected 'B'	Grade I	Grade II
	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack	R.O.M. & Slack
7. Prices as on 24th August 1960* (Increase in 1st June 1961 Re : Royalty Rates)	21.93 (+0.06)	20.93 (+0.06)	20.06 (+0.06)	18.93 (+0.06)
8. Price as on 1st June 1961* (Increase in 29th December, 1961 Re : Royalty Rates)	21.99 (+0.25)	20.99 (+0.25)	20.12 (+0.25)	18.99 (+0.25)
9. Price as on 29th December, 1961*	22.24	21.24	20.37	19.24

Note.—Prices of Coking and Non-coking Coals were differentiated from 12th November, 1955.

*Please see Government Notification No. C5—12(33)60 dated 16th November, 1960 (I.M.A. Circular No. 369—Rb dated 22nd November, 1960). In addition to the prices given, Colliery Owners may be paid the further amount specified below i—

In the case of Selected Grade 'A' (i) if the ash content is less than 14 per cent. A sum of Re. 1 per ton over the price of Selected 'A'.

(ii) if the ash content is 14 per cent or more but is less than 14.5 per cent. A sum of Re. 0.50 per ton over the price of Selected 'A'.

In the case of Selected Grade 'B' If the ash content exceeds 15 per cent but is less than 16 per cent. A sum of Re. 0.50 per ton over the price of Selected 'B'.

In the case of Grade I : If the ash content exceeds 17 per cent but is less than 18 per cent. A sum of Re. 0.50 per ton over the price of Grade I.

APPENDIX IV-B—contd.

PERIOD	RUN OF MINE, DUST AND SLACK COAL (PRICE PER TON OF 2240 lbs.)									
	A	B	C	D	E	F	G	H	HH	
10. Price as on 5th February, 1962 (Increase in 20th March, 1962)	25.20 Nil	24.20 Nil	23.20 Nil	22.20 Nil	21.70 Nil	21.20 Nil	20.70 Nil	20.20 (+0.25)	19.45 Nil	19.45 (+0.06)
11. Price as on 20th March '62 (Increase in 1st June, 1962 Re: Grade & Time Scale)	25.20 (+0.06)	24.20 (+0.06)	23.20 (+0.06)	22.20 (+0.06)	21.70 (+0.06)	21.20 (+0.06)	20.70 (+0.06)	20.45 (+0.06)	19.45 (+0.06)	19.45 (+0.06)
12. Price as on 1st June, 1962 (Increase in 13th June, 1962 Re: Industry's long standing demand)	25.26 (+1.50)	24.26 (+1.50)	23.26 (+1.50)	22.26 (+1.00)	21.76 (+1.00)	21.26 (+0.75)	20.76 (+0.75)	20.51 (+0.75)	19.51 Nil	19.51 Nil
13. Price as on 13th June 1962 (Increase in 20th October, 1962 Re: P.F. Rate increase)	26.76 (+0.10)	25.76 (+0.10)	24.76 (+0.10)	23.26 (+0.10)	22.76 (+0.10)	22.01 (+0.10)	21.51 (+0.10)	**21.26 (+0.10)	19.51 (+0.10)	19.51 (+0.10)
14. Price as on 20th October '62 (Increase in 1st March 1963 Re: Wage Board Interim Award)	26.86 (+0.82)	25.86 (+0.81)	24.86 (+0.82)	23.36 (+0.81)	22.86 (+0.81)	22.11 (+0.81)	21.61 (+0.81)	21.36 (+0.81)	19.61 (+0.81)	19.61 (+0.81)
15. Price as on 1st March '63 (Increase in 1st April 1963 Re: V.D.A.)	27.68 (+0.50)	26.67 (+0.50)	25.68 (+0.50)	24.17 (+0.50)	23.67 (+0.50)	22.92 (+0.50)	22.42 (+0.50)	22.17 (+0.50)	20.42 (+0.50)	20.42 (+0.50)
16. Price as on 1st April '63 (Increase in 1st June, 1963 Re: Grade & Time Scale)	28.18 (+0.06)	27.17 (+0.06)	26.18 (+0.06)	24.67 (+0.06)	24.17 (+0.06)	23.42 (+0.06)	22.92 (+0.06)	22.67 (+0.06)	20.92 (+0.06)	20.92 (+0.06)
17. Price as on 1st June, 63*** (Increase in 5th June 1964 Re: Grade Time & Scale)	28.24 (+0.06)	27.23 (+0.06)	26.24 (+0.06)	24.73 (+0.06)	24.23 (+0.06)	23.48 (+0.06)	22.98 (+0.06)	22.73 (+0.06)	20.98 (+0.06)	20.98 (+0.06)
18. Price as on 5th June 1964 (Increase in 1st October 1964 Re: V.D.A.)	28.30 (+0.50)	27.29 (+0.50)	26.30 (+0.50)	24.79 (+0.50)	24.29 (+0.50)	23.54 (+0.50)	23.04 (+0.50)	22.79 (+0.50)	21.04 (+0.50)	21.04 (+0.50)
19. Price as on 1st October 1964 (Increase in 1st January, 65 Re: Wage Board 2nd Interim Award)	28.80 (+0.40)	27.79 (+0.41)	26.80 (+0.41)	25.29 (+0.41)	24.79 (+0.41)	24.04 (+0.41)	23.54 (+0.41)	23.29 (+0.40)	21.54 (+0.41)	21.54 (+0.41)
20. Price as on 1st January '65 (Increase in 11th May 1965 Re: V.D.A.)	29.20 (+0.41)	28.20 (+0.40)	27.21 (+0.41)	25.70 (+0.40)	25.20 (+0.40)	24.45 (+0.40)	23.95 (+0.40)	23.69 (+0.41)	21.95 (+0.40)	21.95 (+0.40)

APPENDIX IV-B—contd.

PERIOD	RUN OF MINE DUST AND SLACK COAL (PRICE PER TON OF 2240 lbs.)									
	A	B	C	D	E	F	G	H	HH	
21. Prices on 11th May 1965 (Increase in 1st June '65 Re : Grade & Time Scale)	29.61 (+0.06)	28.60 (+0.06)	27.62 (+0.06)	26.10 (+0.06)	25.60 (+0.06)	24.85 (+0.06)	24.35 (+0.06)	24.10 (+0.06)	22.35 (+0.06)	
22. Price as on 1st June 1965 (Increase in 24th Dec. 1965 Re : Payment of Bonus)	29.67 (+0.41)	28.66 (+0.41)	27.68 (+0.40)	26.16 (+0.41)	25.66 (+0.40)	24.91 (+0.41)	24.41 (+0.40)	24.16 (+0.41)	22.41 (+0.41)	
23. Price as on 24th Dec. 1965 (Increase in 3rd Feb. 1966 Re : Royalty)	30.08 (+0.60)	29.07 (+0.61)	28.08 (+0.61)	26.67 (+0.61)	26.06 (+0.61)	25.32 (+0.61)	24.81 (+0.61)	24.57 (+0.61)	22.82 (+0.61)	
24. Price as on 3rd Feb. 1966 (Increase in 16th April 1966 Re : V.D.A.)	30.68 (+0.37)	29.68 (+0.36)	28.69 (+0.37)	27.18 (+0.37)	26.67 (+0.37)	25.93 (+0.37)	25.42 (+0.37)	25.18 (+0.36)	23.43 (+0.37)	
25. Prices as on 16th April 1966 (Increase in 1st October 1966 Re : V.D.A.)	31.50 (+0.37)	30.04 (+0.37)	29.06 (+0.36)	27.55 (+0.36)	27.04 (+0.36)	26.30 (+0.36)	25.79 (+0.36)	25.54 (+0.37)	23.80 (+0.36)	
26. Price as on 1st October 1966 (Increase in 22nd Dec. 1966 Re : Study Group Report)	31.42 (+0.58)	30.41 (+0.58)	29.42 (+0.58)	27.91 (+0.58)	27.40 (+0.58)	26.66 (+0.58)	26.15 (+0.58)	25.91 (+0.58)	24.16 (+0.38)	
27. Prices as on 22nd December, 1966	32.00	30.99	30.00	28.49	27.98	27.24	26.73	26.49	24.54	
28. Price as on 1st April, 1967	32.20	31.21	30.24	28.75	28.25	27.52	27.02	27.78	24.86	

With effect from 5th February, 1962 when the revised grading scheme for coking coal came into force based on as differentials of 1% and extending from below 13% (Grade A) to above 20% but below 24% (Grade HH) and prices were modified accordingly, the prevailing system of incentives was withdrawn.

**Ceiling fixed on Grade HH coal from 13th June, 1962.

***Please see Government Notification No. C5—12(30)/63 dated 3rd March, 1964 (L.M.A. Circular No. 61—Rb dated 11th March, 1964).

In addition to the price specified above for coking coals of Grades 'A' to 'H', every colliery owner shall be paid the following amount where, in pursuance of an agreement between him and the consumer, the grade of the coal supplied is determined by sampling and analysis at the destination in accordance with the procedure laid down by the Government in this behalf, namely:—

- (i) in the case of any of the grades of coking coal 'A' to 'E' — a sum of Rs. 1.27 per ton.
 (ii) in the case of any of the grades of coking coal 'F', 'G' and 'H' — a sum of Rs. 0.76 per ton.

Provided that any dispute in regard to the application of that procedure or the results of such sampling and analysis shall be referred to the Coal Controller whose decision thereon shall be final and binding on the colliery owner and the consumer.

APPENDIX V

(Vide, para 11.5.1)

*Statement showing the estimated demand for Coal during the Fourth Plan Period
and First two years of Fifth Plan Period*

(Million tonnes)

Sl. No.	Consuming Sector	Estimated									
		Actuals	Estimated Actuals	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-1972	1972-73
1	2	3	4	5	6	7	8	9	10		
A. Coking Coal :											
1	Steel Plants	11.89	11.73	17.44	18.39	19.78	22.11	28.66	30.66		
2	Merchant coke ovens	1.22	1.22	1.94	2.26	2.26	3.95	4.25	4.57		
3	Sindri Fertiliser Plant	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18		
4	Export	..	..	0.25	0.25	0.25	0.25	0.25	0.25		
TOTAL		13.29	13.13	19.81	21.08	22.47	26.49	33.34	35.66		

APPENDIX V—contd.

1	2	3	4	5	6	7	8	9	10
B. Blendable Coal :									
1	Steel Plants	1.18	0.91	1.44	1.96	2.08	2.37	3.04	3.22
2	Merchant coke ovens . . . . .	..	..	0.88	0.08	0.18	0.12	0.12	0.12
3	Sindri Fertiliser Plant	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
4	Foundry Forge Plant . . . . .	..	..	..	..	..	0.45	0.45	0.45
	TOTAL	1.36	1.09	1.70	2.22	2.34	3.12	3.79	3.97
C. Non-coking Coal :									
1	Export (a)	0.80	0.40	0.40	0.40	0.40	1.90	1.90	1.90
2	Bunker	0.04	0.04*	0.04	0.04	0.04	0.04	0.04	0.04
3	Ordnance Factories	0.19	0.18*	0.19	0.20	0.21	0.22	0.23	0.25
4	Defence Services	0.09	0.10*	0.10	0.10	0.10	0.10	0.10	0.10
5	Railways	17.20	16.80	16.60	16.40	16.20	16.00	16.00	16.00
6	Port & Lock Railways	0.14	0.14*	0.14	0.14	0.14	0.14	0.14	0.14
7	Inland Steamer Services (a)	0.17	0.05	0.06	0.07	0.08	0.30	0.30	0.30
8	Power Houses	8.60@	8.79	11.12	12.88	14.48	17.57	21.08	21.11

9	Cement	.	.	.	2.94	3.00	3.73	4.28	4.69	5.17	5.52	5.53
10	Paper & Newsprint	.	.	.	1.30	1.30*	1.45	1.53	1.63	1.77	2.01	2.11
11	Cotton Textiles	.	.	.	1.76	1.75	1.82	1.90	1.97	2.05	2.05	2.05
12	Fertilisers	.	.	.	0.43	0.43	0.54	0.66	0.85	0.97	1.01	1.01
13	Heavy Chemicals	.	.	.	0.36	0.36	0.39	0.44	0.47	0.53	0.53	0.53
14	Engineering & Foundaries	.	.	.	0.10	0.10	0.12	0.15	0.20	0.30	0.35	0.40
15	Refractories	.	.	.	0.32	0.32*	0.35	0.40	0.45	0.50	0.55	0.60
16	Tea Gardens	.	.	.	0.20	0.20*	0.22	0.25	0.30	0.35	0.40	0.45
17	Jute Mills (a)	.	.	.	0.31	0.20	0.25	0.25	0.25	0.40	0.40	0.40
18	Re-rolling mills	.	.	.	0.16	0.17*	0.18	0.19	0.20	0.21	0.23	0.25
19	Sugar Mills	.	.	.	0.15	0.10*	0.12	0.14	0.16	0.18	0.20	0.23
20	Ginning & Pressing factories	.	.	.	0.11	0.17*	0.09	0.11	0.13	0.15	0.17	0.20
21	Vanaspati	.	.	.	0.11	0.09*	0.10	0.11	0.13	0.15	0.17	0.20
22	Iron Ores	.	.	.	0.05	0.03*	0.04	0.04	0.05	0.05	0.05	0.05
23	Starch factories	.	.	.	0.04	0.04*	0.05	0.05	0.06	0.06	0.07	0.08
24	G.M.F. (Brick)	.	.	.	..	..	..	..	..	..	..	..
25	Steel plant boilers	.	.	.	0.83	1.25	1.25	1.25	1.14	1.25	1.25	1.25
26	L.T.C.	.	.	.	..	..	..	..	..	0.42	0.83	1.12
27	Aluminium	.	.	.	..	0.23	0.89	0.89	0.89	0.99	1.11	1.11
Total Central Priorities		.	.	.	36.40	36.14	40.24	42.87	45.22	51.77	56.69	57.41

APPENDIX V—contd.

1	2	3	4	5	6	7	8	9	10
<i>State Priorities :</i>									
1	Soft coke	2.73(b)	3.00	3.30	3.64	4.04	4.48	4.93	5.47
2	Brick burning	3.65(b)	3.30	3.64	4.04	4.48	4.93	5.47	6.07
3	Industries	6.06(b)	6.80	7.26	7.77	8.32	8.90	9.52	10.19
Total State Priorities		12.44	13.10	14.20	15.45	16.84	18.31	19.92	21.73
<i>Total non-coking coal</i>									
Total non-coking coal		48.84	49.24	54.44	58.32	62.06	70.08	76.61	79.14
GRAND TOTAL		63.49	63.46	75.95	81.62	86.87	99.69	113.74	118.77

Remarks :

£Does not include new schemes which may be taken up in these years.

(a) Assumes that trade with Pakistan will be resumed in 1970—71.

@ After excluding estimated 1 million tonnes of middlings from the total consumption of 9.59 million tonnes.

(b) Includes estimated movement of about 1 million tonnes of coal by road for BRK, 0.50 million tonnes of soft coke and about 0.60 million tonnes of coal for industries. Rate of growth of 11% per annum for BRK coal and soft coke and 7% per annum for industries over 1966-67 level.

NOTE.—1. *The estimated demand in 1966-67 of these consumers is arrived at as follows :—

$$\frac{\text{(Actual consumption in 1965-66)} \times \text{(Despatches during first 8 months of 1966-67)}}{\text{(Despatches during first 8 months of 1965-66)}}$$

The demand for subsequent years is estimated by adding to the 1966-67 figure the same increments which were previously added to the 1965-66 figure.

2. The above estimates do not take into account colliery consumption and losses in the manufacture of soft coke which are at present about 10% of the production.



APPENDIX VI
(Vide para 18.5.3)
Useful Heat units of different grades of coal

Sl. No.	Grading Criteria	Existing Grade	Typical gross calorific value, K. cal./kg. (B. t. u/lb.)	Ash penalty k. cal./kg.	Useful heat units K. cal./kg.
1	2	3	4	5	6
1	<i>Non-coking coals (Bengal & Bihar)</i>				
	(a) High Moist				
	Ash + Moist. % :				
	(i) Below 17.5	• Sel. A	>6,480 (>11,670)	345 & less	>6135 (>11,040)
	(ii) 17.5 to below 19.0	• Sel. B	6,480—6,360 (11,670—11,450)	345—430	6,135—5,930 (11,040—10,670)
	(iii) 19 to below 24.0	• Gr. I	6,360—5,960 (11,450—10,730)	430 + 720	5,930 + 5,240 (10,670—9,430)
	(iv) 24 to below 28.0	• Gr. II	5,960—5,560 (10,730—10,000)	720—960	5,240 + 4,600 (9,430—8,280)

(b) Low Moist

Ash percentage :					
(v) Below 15.0	•	•	Sel. A	≥ 6,880 (≥ 12,390)	260 & less 6,620 (≥ 11,920)
(vi) 15 to below 17.0	•	•	Sel. B	6,880—6,690 (12,390—12,050)	260—340 6,620—6,350 (11,920—11,430)
(vii) 17 to below 20.0	•	•	Gr. I	6,690—6,420 (12,050 + 11,550)	340—480 6,350—5,940 (11,430—10,690)
(viii) 20 to below 24.0	•	•	Gr. II	6,420—6,060 (11,550—10,900)	480—720 5,940—5,340 (10,690—9,610)
(ix) 24 to below 28.0	•	•	Gr. IIIA	6,060—5,670 (10,900—10,200)	720—960 5,340—4,710 (9,610—8,480)
(x) 28 to below 35.0	•	•	Gr. IIIB	5,670—5,000 (10,200—9,000)	960—1200 4,710—3,800 (8,480—6,840)

2 Coking coal (Bengal & Bihar) Ash percentages :

(xi) Below 13.0	.	.	Gr. A	>7,330 (>13,200)	220 & less	>7,110 (>12,800)
(xii) 13 to below 14.0	.	.	Gr. B	7,330—7,250 (13,200—13,050)	220—240	7,110—7,010 (12,800—12,620)

APPENDIX VI—Contd.

1	2	3	4	5	6
	(xiii) 14 to below 15.0	Gr. C	7,250—7,140 (13,050—12,850)	240—260	7,010—6,880 (12,620—12,380)
	(xiv) 15 to below 16.0	Gr. D	7,140—7,060 (12,850—12,700)	260—300	6,880—6,760 (12,380—12,170)
	(xv) 16 to below 17.0	Gr. E	7,060—6,945 (12,700—12,500)	300—340	6,760—6,605 (12,170—11,890)
	(xvi) 17 to below 18.0	Gr. F	6,945—6,860 (12,500—12,350)	340—380	6,605—6,480 (11,890—11,660)
	(xvii) 18 to below 19.0	Gr. G	6,860—6,780 (12,360—12,200)	380—430	6,480—6,350 (11,660—11,430)
	(xviii) 19 to below 20.0	Gr. H	6,780—6,670 (12,200—12,000)	430—480	6,350—6,190 (11,430—11,140)
	(xix) 20 to below 24.0	Gr. HH	6,670—6,280 (12,000—11,300)	480—720	6,190—5,560 (11,140—10,000)
3	<i>Outlying fields</i>				
	(M. P., Orissa, Maharashtra, Guja- rat) Ash + Moisture Percentage :				
	(xx) Below 19	Scl. Gr.	> 6,390 (> 11,500)	430 & less	> 5,960 (> 10,730)

(xxi) 19 to below 24.0	•	Gr. I	•	6,390—5,890 (11,500—10,600)	430—720	5,960—5,170 (10,730—9,310)
(xxii) 24 to below 28.0	•	Gr. II	•	5,890—5,530 (10,600—9,950)	720—960	5,170—4,570 (9,310—8,230)
(xxiii) 28 to below 35.0	•	Gr. III	•	5,530—4,970 (9,950—8,950)	960—1200	4,570—3,770 (8,230—6,790)

4 Coals of Assam & Andhra are not graded, but Andhra coal may be grouped under Sl. No. 3. For Assam coals, with an ash range of 3—12 % and the gross calorific value range of 7,920—7,000 K. cals/kg. (14,250—12,600 B.t.u./lb.), the useful heat units are 7,880—6,930 K. cals/kg. (14,180—12,240 B.t.u./lb.)

Note.—(i) Figures under col. 5 are quoted from table 1, page 8 of the Report of the Study Group for formulation of a basis for evaluating the useful heat values of coals and other properties in relation to a system of commercial classification of coals for pricing (Jan. 1964).

(ii) It is obvious that the lower figure of the range given in col. (5) is to be deducted from the higher figure of gross calorific value and *vice-versa*.

APPENDIX VII

(Vide para 21.8.4)

Suggested Price Structure

(A) F.O.R. Prices recommended for Bengal & Bihar region with the variable dearness allowance at the seventh slab.

- (i) Price per Million Kilo calories Rs. 5.2207
- (ii) Amount to be added for determining the price of steam coal so that slack coal (assumed at 40% of the total production) may be sold at Rs. 1 per tonne less Rs. 0.40 per tonne

Grades of Coal	Average useful heat value per tonne	Value at Rs. 5.2207 per Million Kilo Cal. (2 × 5.2207)	Price recommended for average steam and slack coal@	Add for differential between steam and slack coal	Price for steam coal Rubble and Smithy nuts (4+5)	Price for Run of Mine, Dust coal and slack (6-Re. 1)	Private sector production excluding non-graded coal estimated for the year 1965-66
1	2	3	4	5	6	7	8

Million K. Cal. Rs./Tonne Rs./Tonne Rs./Tonne Rs./Tonne Rs./Tonne Million Tonnes

I. When the proposed extra excise duty is recovered from the seller :

1. Non-Coking :

(a) High Moisture :

Selected Grade A	.	.	6.135	30.81	30.81	0.40	31.21	30.21	2.031
Selected Grade B	.	.	6.033	30.30	30.30	0.40	30.70	29.70	1.391
Grade I	.	.	5.585	28.05	28.05	0.40	28.45	27.45	6.810
*Grade II	.	.	4.920	24.71	25.00	0.40	25.40	24.40	2.256

(b) Low Moisture :

Selected Grade A	.	.	6.620	33.25	33.25	0.40	33.65	32.65	2.031
Selected Grade B	.	.	6.485	32.57	32.57	0.40	32.97	31.97	1.391
Grade I	.	.	6.145	30.86	30.86	0.40	31.26	30.26	6.810
Grade II	.	.	5.640	28.33	28.33	0.40	28.73	27.73	2.256
*Grade IIIA	.	.	5.025	25.24	25.24	0.40	25.84	26.00	2.319
*Grade IIIB	.	.	4.255	21.37	24.00	0.40	24.40	23.40	2.696

(b) *Low Moisture :*

Selected Grade A	.	.	6.620	33.25	33.25	0.40	33.65	32.65	2.031
Selected Grade B	.	.	6.485	32.57	32.57	0.40	32.97	31.97	1.391
Grade I	.	.	6.145	30.86	30.86	0.40	31.26	30.26	6.810
Grade II	.	.	5.640	28.33	28.33	0.40	28.73	27.73	2.256
*Grade IIIA	.	.	5.025	25.24	25.24	0.40	25.84	26.00	2.319
*Grade IIIB	.	.	4.255	21.37	24.00	0.40	24.40	23.40	2.696

2. *Coking :*

A	.	.	.	7.110	35.71	34.21	..	..	0.584
B	.	.	.	7.060	35.46	33.96	..	..	0.277
C	.	.	.	6.945	34.88	33.88	..	..	0.856
D	.	.	.	6.820	34.25	33.25	..	..	1.003
E	.	.	.	6.683	33.57	33.07£	..	..	2.246
F	.	.	.	6.543	32.86	32.86	..	..	2.294
G	.	.	.	6.415	32.22	32.22	..	..	2.319
H	.	.	.	6.270	31.49	31.49	..	..	2.134
HH	.	.	.	5.875	29.51	29.51	..	..	2.466

*High moisture Grade II and low moisture Grade IIIA & Grade IIIB are recommended for decontrol. The prices indicated are ceilings.

@For coking coal same price is recommended for both steam & slack.

£The price recommended for Grade E has been adjusted to Rs. 33.07 so that it may not exceed the price recommended for Grade D net of excise duty.

APPENDIX VII—*Concl'd.*

(B) F.O.R. Prices recommended for Gujarat, Madhya Pradesh, Maharashtra and Orissa.

(i) Price per Million Kilo calories Rs. 5.3301

(ii) Amount to be added for determining the price of steam coal so that slack coal (assumed at 40% of the total production) may be sold at Re. 1 per tonne less Re. 0.40 per tonne

Grades of Coal	Average useful heat value per tonne	Value @Rs. 5.3301 per Mil- lion Kilo calorie (2 x 5.3301)	Price recom- mend- ed for aver- age of steam & slack coal	Add for differen- tial bet- ween steam and slack coal	Price for steam coal Rubble and Smithy nuts (4 plus 5)	Price for Run-of- Mine Dust coal and slack (6-Re. 1)	Private sector production excluding non- graded coal estimated for the year 1965-66
1	2	3	4	5	6	7	8
Selected Grade B	Million K. Cal. 5.960	Rs./Tonne 31.77	Rs./Tonne 31.77	Rs./Tonne 0.40	Rs./Tonne 32.17	Rs./Tonne 31.17	Million Tonnes 0.637

Grade I	.	.	.	5.565	29.66	29.66	0.40	30.06	29.06	3.153
*Grade II	.	.	.	4.870	25.96	27.00	0.40	27.40	26.40	3.324
*Grade III	.	.	.	4.170	22.23	26.00	0.40	26.40	25.40	1.560

*The prices shown for Grade II and Grade III are ceilings.



APPENDIX VIII

(Vide para 23·5·1)

Statement showing the tentative selling prices, capacity and market demand of the products manufactured by the Mining and Allied Machinery Corporation during the years 1967-68 and 1968-69

For the year 1967-68

Sl. No.	Item	Sale Price (Rs. in lakhs)		Capacity Nos.	Market demand Nos.	Percentage of imported component
		MAMC	Imported landed			
1	2	3	4	5	6	7
1	Centrifugal Pump PM-70 .	0·2	0·25	100	30	nil
2	Centrifugal Pump PM-150 .	0·4	0·45	50	10	nil
3	Centrifugal Pump PM-300 .	1·5	1·0	30	..	nil
4	Belt Conveyor BKU-1 .	2·2	1·9	45	30	2%
5	Auxiliary Ventilator AV 1/ 500-28	0·07	0·08	200	100	nil
6	Auxiliary Ventilator AV2- 500	0·06	0·07	200	not known	nil
7	Friction Prop. Type FP .	0·003	0·003	10,000	12,000	nil
8	Face Pump PF-50	0·025	0·02	..	50	nil
9	Shortwall coal cutter CS-1 .	0·60	0·50	..	10	3%
10	Arcwall Coal-cutter CA-1 .	1·20	1·00	..	50	2%
11	Light scraper chain conveyor SC-17	0·60	0·45	12	12	5%
12	Friction Chock Type FC .	0·008	0·006	1,000	1,200	nil
13	Belt Conveyor BKU-2	3·80	3·90	2	not known	6%
14	Diesel Locomotive LD-6 .	0·95	0·90	12	15	nil
15	Battery Locomotive LB-8 .	1·50	1·40	12	12	15%
16	Endless Haulage HE1-1200 .	0·04	0·038	25	..	nil
17	Direct Haulage HD/BL- 1600	1·20	1·25	..	..	nil

APPENDIX VIII—Contd.

1	2	3	4	5	6	7
18	Scraper Haulage SH-66-1	1.10	1.60	12	12	2%
19	Sand Pump PD-1	0.60	0.80	15	20	nil
20	Mine Car MC-2	..	..	..	..	nil
21	Long wall coal-cutter KMP 3	0.60	0.42	10	5	5%
22	Gathering Arm coal-loader UP-3	1.0	0.95	..	..	10%
23	Shovel type stone loader SL-1	0.75	0.70	2	12	5%
24	Double chain scraper chain conveyor SC/ CP-30	1.60	1.50	20	20	10%
25	Single Scraper chain Con- veyor SK-11	0.90	0.90	..	..	15%
26	Winders :					
	WED-1, 2	} To vary accord- ing to mine require- ment	MAMC price will be near about landed cost.	..	..	5%
	WED-9					
	WED-4, 8, 10					
	WED-3, 5, 12					
27	Mine Fans :					
	MV2-3	} :	Do.	Do.	Upto 10	4 No. 5%
	MV1-1.8					
	MV2-1.8					
	NMV1-1.8 1-3.					
28	Electric Shuttle car SHC-1	2.50	2.25	..	..	4%
29	Battery Locomotive LB-14	1.75	1.90	..	5	10%
30	Director Haulage HD3-1200	0.75	0.70	..	not known	3%
31	Endless haulage HE2-1200	0.50	0.55	20	10	5%
32	Cutter Loaders					
	CC-1	1.20	1.10	}	10	5%
	CCF 1	1.50	1.50			
	IK52W	2.3	2.00			

APPENDIX VIII—Contd.

For the year—1953-60 (Tentative)

Sl. No.	Item	Sale price (Rs. in lakhs)	Capacity Nos.	Market Demand Nos.	Percent- age of import- ed com- ponent	
1	2	3	4	5	6	7
1	Centrifugal Pump PM-70 .	0.2	0.25	100	30	nil
2	Centrifugal Pump PM-150 .	0.4	0.15	50	20	nil
3	Centrifugal Pump PM-300 .	1.5	1.0	30	5	nil
4	Belt conveyor BKU-1 .	2.2	1.9	50	30	2%
5	Auxiliary Ventilator AV1/ 500-23 .	0.07	0.08	200	100	nil
6	Auxiliary Ventilator AV2- 500 .	0.06	0.07	200	50	nil
7	Friction Prop Type F.P. .	0.003	0.003	15,000	15,000	nil
8	Face Pump PF-50 .	0.025	0.02	100	100	nil
9	Shortwall Coal-cutter CS-1 .	0.60	0.50	..	12	3%
10	Arcwall Coal-cutter CA-1 .	1.20	1.00	10	25	2%
11	Light scraper chain con- veyor SC-17 .	0.60	0.45	25	25	5%
12	Friction Chock Type FC .	0.008	0.006	2,000	2,000	nil
13	Belt-Conveyor BKU-2 .	3.80	3.90	12	10	6%
14	Diesel Locomotive LD-6 .	0.95	0.90	40	30	nil

APPENDIX VIII—Contd.

1	2	3	4	5	6	7
15	Battery Locomotive B-8	1.50	1.40	25	15	15%
16	Endless Haulage HEI-1200	0.04	0.038	25	12	nil
17	Director Haulage HD/BL-	1.20	1.25	12	10	nil
18	Scraper Haulage SH-66-1	1.10	1.60	20	12	2%
19	Sand Pump PD-1	0.60	0.80	30	12	nil
20	Mine Car MC-2					nil
21	Long wall coal-cutter KMP3	0.60	0.42	12	10	5%
22	Gathering Arm coal-loader UP-3	1.0	0.95	12	..	10%
23	Shovel type stone loader SL-1	0.75	0.70	12	15	5%
24	Double chain scraper chain conveyor SC/CP-30	1.60	1.50	20	20	10%
25	Single scraper chain con- veyor SK-11	0.90	0.90	..	..	15%
26	Winders :					
	WED-1,2 } WED-9 } WED-4,8,10 } WED-3,5,12 }	To vary accord- ing to Drive require- ment	MAMC price will be near about landed cost	..	..	5%
27	Mine fans :					
	MV2-3 } MV1-1.8 } MV2-1.8 } NMV1-1.8 } 1-3 }	Do.	Do.	upto 10 nos.	4 nos.	5%

APPENDIX VIII—*Contd.*

1	2	3	4	5	6	7
28	Electric Shuttle Car SHC-1	2.50	2.50	2	12	4%
29	Battery Locomotive LB-14	1.75	1.90	10	10	10%
30	Direct Haulage HD3-1200	0.75	0.70	20	15	3%
31	Endless haulage HE2-1200	0.50	0.55	20	10	5%
32	<i>Cutter loaders :</i>					
	CC-1	.	.	.	1.20	1.10
	CCF-1	.	.	.	1.60	1.50
	IK52W	.	.	.	2.3	2.00



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APPENDIX IX

(Vide para 29.2)

Statement showing the targets of future production of washed coal and middling during 1966-67 to 1970-71

*C = Clean Coal

M = Middlings

(In million tonnes)

Washeries	1966-67			1967-68			1968-69			1969-70			1970-71			Remarks
	Raw coal input	C	M	Raw coal input	C	M	Raw coal input	C	M	Raw coal input	C	M	Raw coal input	C	M	
I. Existing Washeries																
1. Jamadoba (TISCO)	1.44	0.96	0.28	1.44	0.96	0.28	1.44	0.96	0.28	1.44	0.96	0.28	1.44	0.96	0.28	
2. W. Bokaro (TISCO)	0.45	0.30	0.15	0.45	0.30	0.15	0.45	0.30	0.15	0.45	0.30	0.15	0.45	0.30	0.15	
3. Lodna (TISCO)	0.40	0.24	0.16	0.40	0.24	0.16	0.40	0.24	0.16	0.40	0.24	0.16	0.40	0.24	0.16	
4. Dugda I (HSL)	2.16	1.30	0.86	2.16	1.30	0.86	2.16	1.30	0.86	2.16	1.30	0.86	2.16	1.30	0.86	(a)
5. Bhojardi (HSL)	1.80	1.25	0.55	1.80	1.25	0.55	1.80	1.25	0.55	1.80	1.25	0.55	1.80	1.25	0.55	(a)
6. Patigardi (HSL)	1.25	0.80	0.29	1.50	0.95	0.38	1.80	1.15	0.45	2.00	1.35	0.55	2.25	1.55	0.75	(b)
7. Durgapur (HSL)	1.50	0.90	0.33	1.50	0.90	0.33	1.50	0.90	0.33	1.50	0.90	0.33	1.50	0.90	0.33	
8. Kargali (NCDC) (including Exten.)	1.85	1.30	0.37	2.30	1.60	0.46	2.60	1.80	0.52	2.72	1.90	0.54	2.72	1.90	0.54	
TOTAL	10.85	7.05	2.78	11.55	7.50	2.96	11.85	7.70	3.02	12.27	8.00	3.11	12.27	8.00	3.11	
II. Washeries under construction																
9. Dugda II (HSL)	..	..	..	1.20	0.60	0.60	2.20	1.10	1.10	2.20	1.10	1.10	2.20	1.10	1.10	(c)
10. Katbara (NCDC)	..	..	..	1.20	0.60	0.48	1.20	0.60	0.48	2.25	1.12	0.80	2.25	1.12	0.80	(c)
11. Durgapur (W.B.)	0.30	0.15	0.15	0.90	0.45	0.45	1.30	0.65	0.65	1.60	0.80	0.80	1.60	0.80	0.80	(c)
TOTAL	0.30	0.15	0.15	3.30	1.65	1.53	4.70	2.35	2.23	6.05	3.20	2.80	6.05	3.02	2.80	
III. New Washeries																
12. Sprag (NCDC IN-CLUDING EXTN.)	..	..	..	..	..	..	..	..	..	0.40	0.26	0.13	0.75	0.40	0.35	(f)
13. Suidandhi (NCDC)	..	..	..	..	..	..	..	..	..	0.70	0.40	0.23	1.74	1.05	0.51	
14. Mondhi (NCDC)	..	..	..	..	..	..	..	..	..	..	..	..	0.63	0.38	0.19	
15. Pundi/Taping/Kedia (NCDC)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
or	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rangarh I (NCDC)	..	..	..	..	..	..	..	..	..	..	..	..	0.80	0.40	0.40	
16. Rangarh I (NCDC)	..	..	..	..	..	..	..	..	..	..	..	..	1.37	0.82	0.30	
17. Govindpur (NCDC)	..	..	..	..	..	..	..	..	..	..	..	..	0.60	0.30	0.25	
18. Chaspara (TISCO)	..	..	..	..	..	..	2.50	2.00	0.10	1.15	0.90	0.08	1.60	1.30	0.10	
TOTAL	..	..	..	..	..	..	2.50	2.00	0.10	2.25	1.56	0.44	7.49	4.65	2.10	
Gidi (NCDC)	..	..	..	1.58	1.04	0.50	1.93	1.16	0.58	2.23	1.34	0.67	2.30	1.50	0.75	(e)
GRAND TOTAL	11.15	7.20	2.93	16.43	10.19	4.99	20.98	13.21	5.93	22.80	13.92	7.02	28.11	17.7	8.76	

(a) At 90% utilisation capacity.

(b) At 57% utilisation capacity in 1966-67, 75% in 1967-68 and 1968-69 and 90% in 1969-70 and 1970-71.

(c) At 50% utilisation capacity in 1967-68, and 90% in 1968-69, 1969-70, and 1970-71.

(d) At 40% utilisation capacity in 1967-68 and 1968-69 and 75% in 1969-70 and 1970-71.

(e) At 50% utilisation capacity in 1967-68, 58% in 1968-69 and 67% in 1969-70 and 15% in 1970-71.

(f) Figures adopted as advised by NCDC in their letter No. PU/582/11174, dated 29.6.1966.

Vide para 29.3)

at the meeting of the Permanent Committee held on 16-7-1966

Sl. No.	Name of the power stations	No. & rating of their expected units of Commissioning	1966-67				1967-68				1968-69				1969-70				1970-71				
			Demand	W by products	Linked wattery	Balance Raw Coal	Demand	W by products	Linked wattery	Balance Raw Coal	Demand	W by products	Linked wattery	Balance Raw Coal	Demand	W by products	Linked wattery	Balance Raw Coal					
1	Bokaro	2 x 75 Existing 1 x 75	30	0.68	Kargali	0.37	0.31	0.68	Kargali	0.45	0.23	0.68	Kargali	0.51	0.17	0.68	Kargali	0.54	0.14	0.68	Kargali	0.54	0.14
2	Durgapur (DVC)	2 x 75 Existing 2 x 30 Existing 2 x 30 Existing	35 30 30	0.66 0.16 0.16	Durgapur Jamadoba Lodna	0.40 0.16 0.16	0.40 0.16 0.16	0.87 Durgapur Jamadoba	0.16 0.16 0.16	0.23 0.16 0.16	0.87 Durgapur Jamadoba	0.16 0.16 0.16	0.23 0.16 0.16	0.87 Durgapur Jamadoba	0.16 0.16 0.16	0.23 0.16 0.16	0.87 Durgapur Jamadoba	0.16 0.16 0.16	0.23 0.16 0.16	0.87 Durgapur Jamadoba	0.16 0.16 0.16	0.23 0.16 0.16	
3	Durgapur Projects P.S.	2 x 75 Existing 1 x 75 March '66 1 x 150 April '70	38+2 56 70	0.68 0.15 0.15	Durgapur W.B. W.B.	0.45 0.15 0.15	0.45 0.15 0.15	0.68 Durgapur W.B.	0.45 0.15 0.15	0.41 0.15 0.15	0.68 Durgapur W.B.	0.45 0.15 0.15	0.41 0.15 0.15	0.68 Durgapur W.B.	0.45 0.15 0.15	0.41 0.15 0.15	0.68 Durgapur W.B.	0.45 0.15 0.15	0.41 0.15 0.15	0.68 Durgapur W.B.	0.45 0.15 0.15	0.41 0.15 0.15	
4	Bardoli	1 x 82.5 Existing 1 x 82.5 April '66 1 x 82.5 April '66	40+3 66 66	0.93 0.65 0.65	Lodna	0.33 0.19 0.19	0.33 0.19 0.19	1.00 Dugda I Dugda II	0.16 0.65 0.65	0.77 0.26 0.26	1.00 Dugda I Dugda II	0.16 0.65 0.65	0.77 0.26 0.26	1.00 Dugda I Dugda II	0.16 0.65 0.65	0.77 0.26 0.26	1.00 Dugda I Dugda II	0.16 0.65 0.65	0.77 0.26 0.26	1.00 Dugda I Dugda II	0.16 0.65 0.65	0.77 0.26 0.26	
5	Chandrapura	2 x 140 Existing 1 x 50 March '66 1 x 50 Oct. '66	43 66 66	0.84 0.19 0.19	Dugda I Dugda II Dugda II	0.45 0.19 0.19	0.45 0.19 0.19	1.26 Dugda I Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	
6	Patana	1 x 50 Oct. '66 1 x 50 Oct. '66 1 x 100 Mar. '68 1 x 100 Mar. '68 1 x 100 Oct. '70 1 x 100 Oct. '70 1 x 100 Jan. '71 1 x 100 Mar. '71	45 66 66 66 66 66 66 66	0.45 0.19 0.19 0.19 0.19 0.19 0.19 0.19	Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.45 0.19 0.19 0.19 0.19 0.19 0.19 0.19	0.45 0.19 0.19 0.19 0.19 0.19 0.19 0.19	1.26 Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.65 0.65 0.65 0.65 0.65 0.65 0.65	0.46 0.26 0.26 0.26 0.26 0.26 0.26	1.26 Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.65 0.65 0.65 0.65 0.65 0.65 0.65	0.46 0.26 0.26 0.26 0.26 0.26 0.26	1.26 Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.65 0.65 0.65 0.65 0.65 0.65 0.65	0.46 0.26 0.26 0.26 0.26 0.26 0.26	1.26 Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.65 0.65 0.65 0.65 0.65 0.65 0.65	0.46 0.26 0.26 0.26 0.26 0.26 0.26	1.26 Dugda I Dugda II Dugda II Dugda II Dugda II Dugda II Dugda II	0.65 0.65 0.65 0.65 0.65 0.65 0.65	0.46 0.26 0.26 0.26 0.26 0.26 0.26	
7	Santalal	1 x 120 Existing 1 x 120 April '70 1 x 120 Oct. '70 1 x 120 Mar. '71	45 66 66 66	0.84 0.19 0.19 0.19	Dugda I Dugda II Dugda II Dugda II	0.45 0.19 0.19 0.19	0.45 0.19 0.19 0.19	1.26 Dugda I Dugda II Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	1.26 Dugda I Dugda II Dugda II	0.65 0.65 0.65	0.46 0.26 0.26	
Heavy Water Plant			4.42	1.78	2.64	5.31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
STEEL WORKS :																							
TISCO			0.23	Jamadoba	0.18	0.15	0.33	Jamadoba	0.18	0.15	0.33	Jamadoba	0.18	0.15	0.33	Jamadoba	0.18	0.15	0.33	Jamadoba	0.18	0.15	
USCO			0.17	W. Bokaro	0.15	0.17	W. Bokaro	0.15	0.17	0.33	Chasalia	0.17	0.33	Chasalia	0.17	0.33	Chasalia	0.17	0.33	Chasalia	0.17	0.33	
Durgapur IISL			0.17	Durgapur	0.17	0.17	Durgapur	0.17	0.17	0.17	Durgapur	0.17	0.17	Durgapur	0.17	0.17	Durgapur	0.17	0.17	Durgapur	0.17	0.17	
Bakaro			0.50	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
TOTAL STEEL WORKS			4.92	2.28	2.64	5.81	4.17	1.64	6.72	4.81	1.91	7.14	5.80	1.34	9.22	7.60	1.63	9.77	7.60	1.63	9.77	7.60	

Availability of W.By-Products vide Appendix IX. Surplus

W. By Products.

0.56 Rhinoid: 0.00

0-10
0-20
0-30
0-40
0-50
0-60
0-70
0-80
0-90
0-100
0-110
0-120
0-130
0-140
0-150
0-160
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